THE ENGINEERING AND MINING JOURNAL.

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NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

CONTENTS.

EDITORIALS:
The Hoosac Tunnel Machinery..... 485
The Double Standard 485
Judges at the International Exhibition of 1876..... 486
International Exhibition of 1876, No. 2... 486
Oliver's Patent Blasting Cartridges and Powder-Making Machinery..... 488
Colorado..... 489
Furnace Linings 489
Excellent Work of the Bangor and Bay Furnaces, Mich..... 489
Fires in Coal Mines and their Extinction. 491
Manufacture of Bessemer Iron and Steel In Belgium, Sweden..... 492
The Spathic Iron Ores of the Hudson River 493
Mining Notes from Montanna, Utah, Colorado, Idaho and Michigan..... 493
Notes 481
STATISTICS OF COAL PRODUCTION.. 494
COAL TRADE REVIEW 494
IRON MARKET REVIEW..... 496
METALS..... 497
FINANCIAL:
New York Stocks 497
Philadelphia Stocks..... 498
Copper Stocks 498
Gold and Silver Stocks..... 498
Gas Stocks..... 498

AMERICAN INSTITUTE OF MINING ENGINEERS. OFFICIAL BULLETIN.

THE Council of the Institute has, in accordance with the resolution adopted at the Cleveland meeting, October, 1875, appointed the Secretary's office for the annual meeting of the Institute, May 23d, at 1 o'clock P. M. After the election of officers, and without the transaction of other business or reading of papers, the meeting will adjourn to June 20th. This adjourned meeting will be held in Philadelphia at the hall of the Franklin Institute, Seventh Street below Market, beginning Tuesday evening, June 20, at 8 o'clock.

The joint discussion, with the Society of Civil Engineers, of the subject of Technical Education, will be held on Monday evening, June 19, at the same place.

Members who have papers to present at the June meeting are requested to send them to the Secretary before the meeting.

The Board of Directors of the Society of Civil Engineers, has extended a cordial invitation to the members and associates of the Institute, to attend the eighth annual convention of the Society, in Philadelphia, June 13th to 15th, and to take active part in its deliberations. The sessions of the Society will be held daily from 9.30 o'clock A. M. to 1.30 o'clock P. M., in the Judge's Hall on the Centennial grounds.

Members of the Institute who expect to attend the sessions of the Society of Civil Engineers, are requested to send their names to the Secretary of the Institute.

THOMAS M. DROWN, Secretary.

EASTON, PA.

THE German Commissioners ALTHANS, BROJA, DIEFENBACH, RICHTER and KOCH were shown through the works at Hell Gate on Wednesday, 17th inst. They displayed great interest in the undertaking, inquiring particularly into he subject of rock-drilling as practised there, and in conclusion expressed themselves much pleased at the way in which the work had been conducted. and thought the experiment of a combined blasting operation, as about to be practised there, could not fail to be of the greatest scientific interest.

In the evening these gentlemen attended, by invitation, a meeting of the Society of Civil Engineers, where they were welcomed by many of our most distinguished engineers.

THE HOOSAC TUNNEL MACHINERY.

THE Hoosac Tunnel has been so long before the people of this country, as an unfinished enterprise, that the announcement made more than a year ago, that it was at last completed, could scarcely be credited. While driven under the State, and under several subsequent contractors, this great work was more notorious as an adit to the State treasury than as a great engineering enterprise. So general was the belief in the strength of the rings that controlled the letting of the contract, that when this was finally awarded to Messrs. F. SHANLY & Co., who were not only experienced and skillful engineers, but gentlemen whose names were a guaranty that nothing but the most honorable and upright dealing would be permitted, it was plainly intimated by some who claimed to have intimate knowledge of the workings of the "Tunnel ring," that these contractors would never finish the work, so great would be the obstacles thrown in their way by those who had formerly made the tunnel a source of illegitimate profit.

These difficulties and obstacles were not exaggerated, for it is well known that nothing but the most indomitable energy enabled the contractors to carry the work to a successful termination. The natural difficulties of water, fire, and the nature of the rocks driven through, were exceptionally great, and necessitated a much larger expenditure than could have been expected. But these difficulties were still further increased by the failure of the State to carry out the terms of the contract in a prompt and honorable manner.

The contractors completed, in the most satisfactory manner, and, it is said, at a considerable pecuniary sacrifice, a most difficult work, and one which is of considerable advantage to the State, and it is greatly to be regretted that the Government of a great State should resort to those devices to avoid the fair and honest performance of their engagements, which, when practiced by individuals, are characterized as "tricky" and "dishonorable."

The work being completed, the machinery used is offered for sale. This plant consists of a large number of rock drills, air compressors, and pumps, a diamond drill, wire ropes, etc., etc., which are all said to be "in good serviceable condition." The prices at which this machinery is offered are so exceedingly low that we presume it will be quickly disposed of, and thus will close the last chapter in the driving of this, the greatest American tunnel.

THE DOUBLE STANDARD.

WE have carefully read the speech of Hon. J. P. JONES, of Nevada, delivered in the United States Senate, on the 24th ult., and since printed in a pamphlet of 127 pages. An address so long and elaborate, and accompanied with such an array of statistical exhibits, naturally challenges an equally extended and detailed reply; but this would be far beyond the capacity of our columns and we must be content for the present with a general criticism, reserving to ourselves the opportunity of recurring to the subject, as occasion may serve. It is likely that among the profound and accurate thinkers of whom, we are glad to say, the American Congress contains not a few, some will take the pains to analyze at length Senator JONES's argument; and we advise our readers to obtain from Washington full copies of the leading speeches on both sides.

Senator JONES entitles his speech "Resumption and the Double Standard; or, The Impossibility of Resuming Specie Payments in the United States without Restoring the Double Standard of Gold and Silver." But his treatment of the subject goes much further. He defends the double standard as a principle of political economy, ascribes to it nearly all the blessings, and to its opposite nearly all the evils which human history records. This sweeping and one-sided method imparts to the address a *prima facie* partisan and untrustworthy appearance. The Senator attempts to prove too much, and brings forward his proofs too recklessly, to produce the impression of a candid and thorough inquiry. A different tone and a more limited scope of discussion would have increased the force of his reasoning.

Still more objectionable is the line of comment in which Senator JONES indulges himself, concerning all who differ with him, at home and abroad. The appeal to national prejudices, and to communistic tendencies in such a debate, is worse than illogical and unjust: it is vulgar. We have heard before of "British gold" as an element of financial science; but it was reserved for this latest orator to announce that gold itself is "essentially a British product," and silver "essentially American;" that the system of finance which has made England prosperous, is to be rejected on that account; that the pens of able writers who advocate, on scientific grounds, the single gold standard of money have been bought by the "plutocracy"—and much more of the same sort of rubbish, which Senator JONES is too intelligent to believe, and the utterance of which, if intended to commend its author to his own constituents, will prove, in our opinion, as injurious to his fame as it is unworthy of his real ability.

Perhaps the most unjustifiable passages of this kind in the Senator's speech are those in which he attacks, with ignorant contempt, the Coinage Act of 1873, as "a wrong committed, no doubt unwittingly, yet no less certainly, in the interest of a few plutocrats in England and in Germany, and as certainly in the interest of the entire Pagan and Barbarian world." He says "the manner in which this legislation was effected leaves but little reason to infer that any deliberate judgment was exercised on this important question of the standard;" and again, "the impartial observer at the present time finds it difficult to account for the introduction of such a bill when specie payments were suspended and unprovided for, unless upon some such ground as Mr. POTTER suggested, to wit, either the interest of the owners of nickel mines at home, or of that of creditors at home or abroad." It is to be regretted that a gentleman who begins his review of this subject 1900 years before Christ, and extends several centuries beyond the present time, should have omitted to consult more thoroughly the recent records of the Senate and the House. Instead of originating in 1872, as he asserts, the coinage bill originated in 1869, in which year Hon. JOHN JAY KNOX, then Deputy Comptroller of Currency, and in charge also, at the request of successive Secretaries, of the mint correspondence of the Department, prepared the draft of a bill condensing, revising, amending and codifying all previous legislation on the subject. In perfecting this bill, and in extensive correspondence concerning it, Mr. KNOX spent at least a year. We recommend to Senator JONES the perusal of Senate Miscellaneous Document No. 132, of the second session of the 41st Congress, which contains the bill and an explanatory report, transmitted April 25, 1870; and of EX. DOC. H. of R. No. 307, of the same session, dated June 25, 1870, which contains the correspondence of the Department on the subject. He has, probably, never heard of these, or of the prolonged discussion of the bill in the Committees, the hearing by them of different individuals and deputations, and the articles which appeared on the topic in various journals. If he had looked into this part of his theme more carefully, he would not have rewarded the zealous, efficient and entirely unpaid services of Mr. KNOX with the cheap insinuation that the work was done in the interest of gold and nickel "plutocrats," and the result hurried through the stages of legislation without debate. As a matter of fact, the bill passed the Senate in 1871, but did not pass the House during that Congress. In the next Congress, it was introduced again in the House by Mr. HOOPER, Chairman of the Committee on Coinage; and this revival of it, after nearly three years of public and private consideration, is what Mr. JONES calls its "origin!" The circumstance that the Senate, without much debate, subsequently passed its own bill, thus revived and presented to it by the House, may be ascribed to the influence of concealed "plutocrats," by any one who

cares to waste time in such speculations. To us it seems rather a praiseworthy exhibition of common sense and business efficiency.

Senator JONES's grievance is that the silver dollar was not included in the coins of this bill. The silver dollar was practically demonetized by the act of June 28, 1834, which reduced the weight of fine gold to the dollar from 24·75 to 23·20 grains. The act of January 18, 1837, fixed the gold dollar at 23·22 grains of fine gold, where it still remains. The act of February 21, 1853, demonetized the fractional silver coins, all the silver coins having been, up to that time, legal tender. Senator JONES might with more propriety have attacked the acts of 1834 and 1853 than that of 1873. For twenty years previous to the last date, we had had practically but one metallic standard. The nominal legal tender character of the silver dollar exercised no influence. It was not, and could not be, in circulation. We stopped coining it, and our law concerning it was a dead letter. What the act of 1873 did was not new. It simply retained the subsidiary silver coinage, and said nothing about the already obsolete dollar.

All Senator JONES's arguments about the amount of precious metals required for currency, and the advantage of basing coinage on the aggregate supply of gold and silver, instead of either separately, are shattered by the simple experience of all nations that the two metals will not circulate as legal tender together. The double standard means simply an alteration from one metal to the other, and the temporary circulation of the depreciated metal, to the exclusion of the other. A currency, one-half of which is perpetually in the process of disappearing, or has already disappeared—this is his idea of an "equilibrium." A debtor saying to his creditor, "I received from you gold; but if silver is cheaper when my debt is due, I will pay you in silver"—this is what he denominates "justice." A government interfering ("once in ten or twenty years," he thinks, will be often enough) to tinker the relations of commerce by the arbitrary declaration of a new legal standard—this is "stability."

There is no escape from these conclusions except in the Utopian dream of a "common consent" of all nations, which underlies portions of Mr. JONES's speech. If everybody would agree that gold and silver, independent of all variations of supply and demand, should bear a permanent ratio of value, then, of course, so long as that agreement lasted, the problem of circulating them together would be easily solved. But how long would this millenial condition continue, before some "plutocrat" or autocrat or democrat, holding a large amount of government bonds, or owning, if you please, a BONANZA of gold or silver, would commence with deep, dark intrigues, such as have disgraced (according to JONES's History of the Universe) the annals of perfidious Albion, to upset the beautiful equilibrium so laboriously established? The "barbarians" might do it—even the demagogues might take a hand in it.

The present time is peculiarly unfortunate for the proposition of Senator JONES to restore the double standard, practically abandoned by this country since 1853. What he wants us to do is to commence again coining the dollar of 371¼ grains fine silver. The value of this amount of silver in the market is about 90 cents gold. The result of issuing a legal-tender dollar of that value would be, of course, to force the exportation of gold. We infer from page 4 of Senator JONES's speech that "free coinage," which he ascribes "with other free institutions" to the American Revolution, is a part of his scheme. Free coinage and a 90 cent legal-tender silver dollar would constitute, it strikes us, an arrangement savoring more of the plots of plutocracy than anything which the Senator has raked from the residues of history. People who had silver to sell would be glad enough to coin every 90 cents' worth of it into a dollar, but people who were forced to receive that dollar might protest.

But there is no security that the silver dollar would remain at that value. Senator JONES vehemently asserts that gold is subject to greater fluctuations than silver. But at the present time every child knows that it is the value of silver, not gold, which constitutes the uncertain element. Nobody can say whether it will go up or down—not even the "plutocrats." Senator JONES's assurances that the limits of the *bonanza* have been reached, are indignantly contradicted by telegrams from Virginia City. He cannot give us any guaranty that the despots of Europe, or the barbarians of Asia, will not do or fail to do, something to affect the value of silver. He cannot fix a value for the silver dollar that would certainly prevent profitable private coinage, to say nothing of permitting the joint circulation of gold and silver.

We are in favor of such a joint circulation; and because we desire it, and know that a double standard makes it impracticable, we oppose the double standard. DOGBERRY spoke more wisely than JONES, when he said "An two ride of a horse, one must ride behind." If gold and silver are to permanently co-exist as currency in any country, one must be subsidiary and the other standard.

Senator JONES may blow his silver trumpet and wave his double standard never so gallantly: the people will not follow him. And if he continues to urge the overvaluation of silver while its real value is tending steadily downward, some unmannerly declaimer may call *him* a "plutocrat," and thus slay him with his own weapon.

JUDGES AT THE INTERNATIONAL EXHIBITION OF 1876.

THERE are in all 250 judges, of whom 225 are appointed by the Centennial Commission, and 100 by foreign Governments. The following are the names of the judges in those groups under which mining, metallurgy, engineering, and other matters of interest to our readers are classified. There are in all twenty-eight groups:

GROUP I.—*Minerals, Mining, and Metallurgy.*

A. L. HOLLEY, New York.	W. S. KEYES, Nevada.
T. STERRY HUNT, Mass.	FRED. PRIME, Penna.
S. J. REEVES, Penna.	British Judge, I. LOWTHIAN BELL, M.P.
J. M. SAFFORD, Tenn.	Swedish Judge, RICHARD AKERMAN.
S. B. AXTELL, New Mexico.	Belgian Judge, A. JOTTRAND.
MATTHEW ADDY, Ohio.	German Judge, E. ALTHANS.
J. D. HAGUE, California.	French Judge, M. SIMONIN.

GROUP II.—*Pottery, Glass, Refractory Materials, Artificial Stone, etc.*

Gen. Q. A. GILMORE, U. S. A.	HECTOR TYNDALL, Penna.
ARTHUR BECKWITH, New York.	C. M. CHAFFIET, South Carolina.
E. T. COX, Indiana.	British Judge, R. H. SODEN SMITH.

GROUP III.—*Chemistry and Pharmacy, including Apparatus.*

C. A. JOY, New York.	C. F. CHANDLER, New York.
F. A. GENTH, Pennsylvania.	British Judge, Dr. ODLING.
J. LAWRENCE SMITH, Kentucky.	

GROUP XIV.—*Apparatus for Heating, Lighting, Ventilation, Water Supply, and Drainage.*

C. C. COX, Washington, D. C.	Dr. AZEL AMES, Mass.

GROUP XV.—*Builders' Hardware, Edge Tools, Cutlery, etc.*

DANIEL STEINMETZ, Pennsylvania.	G. L. BEAD, Pennsylvania.
CHAS. STAPLES, Maine.	

GROUP XVI.—*Military and Sporting Arms, Weapons, Explosives, etc.*

S. C. LYFORT, U.S.A.	GEO. A. HAMELTON, Minnesota.
H. ABBOT, U.S.A.	

GROUP XVIII.—*Railway Plans, Rolling Stock and Apparatus, Road Engines, etc.*

R. E. RICKER, New Jersey.	FELICIEN STATALAPER, Pennsylvania.
GEN. MORRIS, Indiana.	British Judge, Sir JOHN HAWKSHAW.

GROUP XIX.—*Vessels and Apparatus of Transportation.*

ISAAC NEWTON, New York.	British Judge, Col. F. H. RICH, R. E.
J. W. GRIFFITHS, New Hampshire.	French Judge, M. GUIET.

GROUP XX.—*Motors, Hydraulic and Pneumatic Apparatus.*

CHAS. F. PORTER, New Jersey.	JAMES MOORE, Penna.
JOSEPH BELKNAP, New York.	HORATIO ALLEN, New York.
J. F. HALLOWAY, Ohio.	British Judge, W. H. BARLOW, C. E.

GROUP XXI.—*Machine Tools, Wood, Metal, and Stone.*

IRVING M. SCOTT, California.	British Judge, JOHN ANDERSON, LL. D.
G. H. BLELOCK, Massachusetts.	C. E.
W. F. DURFEE, Wisconsin.	French Judge, M. PERIER.
J. A. ANDERSON, Kentucky.	

GROUP XXV.—*Instruments of Precision, Research, Experiment, and Illustration, including Telegraphy and Music.*

Prof. F. A. P. BARNARD, New York.	GEO. F. BRISTOW, New York.
J. E. HILGARD, U. S. Coast Survey.	Prof. WATSON, Michigan.
H. K. OLIVER, Massachusetts.	French Judge, M. LEVASSEUR.

GROUP XXVI.—*Architecture and Engineering.*

JAMES B. EADS, Missouri.	RICH'D M. HUNT, Rhode Island.
Gen. W. B. FRANKLIN, Conn.	British Judge, Sir JOHN HAWKSHAW.

GROUP XXVIII.—*Education and Science.*

ANDREW D. WHITE, New York.	J. W. HOYT, Wisconsin.
DANIEL C. GILMAN, Maryland.	British Judge, Sir CHARLES REED, M. P.
J. M. GREGORY, Illinois.	French Judge, M. FOURET.

INTERNATIONAL EXHIBITION OF 1876.

Special Report of the Engineering and Mining Journal, No 2.

WE have, as a race, such a reputation as guessers that our national pride must feel somewhat wounded over the differences between the estimated and probable number of those who attended the Exhibition on the opening day. Almost every one said there were at least 250,000, and the man who put the number at only 200,000 was looked upon with suspicion, as being either warped in judgment by a foreigner's prejudice or in some way an enemy of the Exhibition. When the money was counted, however, it was found to have been much smaller. The number, however, was so great that, although the principal buildings are immense, uncomfortable crowds were so numerous that every one concerned will be benefited in the future by the non-recurrence of such a concourse. Grass and shrubbery were among the worst sufferers from this cause. It is now said that the Commission will so arrange the special attractions in July as to have them extend over several weeks instead of having them all concentrated on the "Fourth." The receipts during the week show the attendance to have been as follows:

Date.	Paying Visitors.	Complimentary.	Press, Exhibitors, etc	Total Visitors.
May 10.....	76,217	30,000*	10,000*	116,217
" 11.....	14,722	2,001	2,274	18,997
" 12.....	10,252	162	2,306	12,710
" 13.....	11,658	357	4,847	16,862
" 15.....	10,897	367	4,585	15,849
" 16.....	7,056	355	5,702	13,113
Totals...	130,802	33,242	29,714	193,748

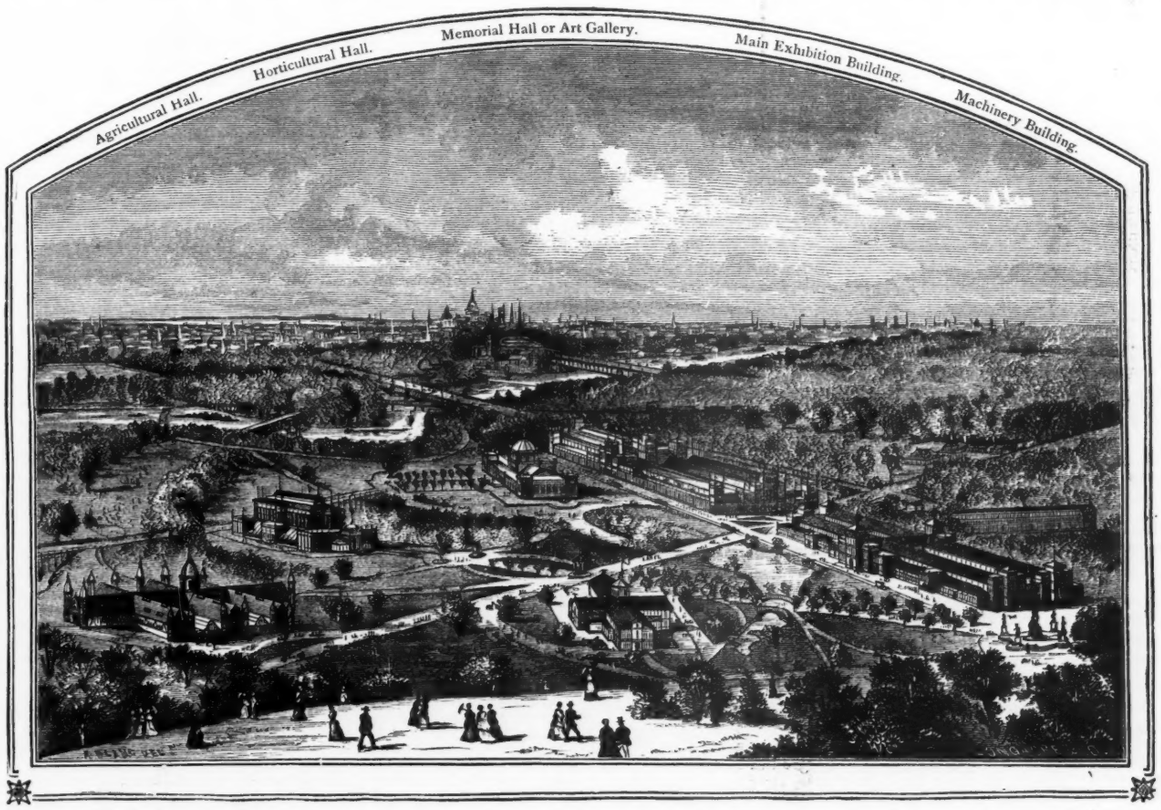
In this connection it may be said that the Centennial authorities have shown every disposition to facilitate the getting of information by all who really represent newspapers.

The rather chaotic condition in which portions of the grounds were a week ago is now somewhat improved, although around some of the buildings much is yet left to be done. On Friday an occurrence took place, owing to unremoved rubbish, which fortunately did not result seriously. The space lying to the south of the Main Building, which has been partially taken up by the mineral annexes, had become covered with a mass of shavings, old packing papers, pieces of boxes, lumber, etc., which, by some means, were set on fire that day about noon. The point where the fire started was near the extreme south-east corner of the fence, and before any water could be brought to bear upon it nearly 100 feet square was ablaze. The air was fortunately very still, so that none of the burning fragments were blown about. Had there been a strong wind from the south at the time, the Main Building would have been considerably endangered. The fire brigade were soon at work, and, with hydrant streams, soon extinguished it. Fortunately there were but few who knew of the occurrence, and there

*Estimated. The number of complimentary, exhibitors, press, and other free tickets, on the opening day was not reported. We have estimated them as above. The remaining figures in the table are official.

was no excitement Nearly all of the remaining rubbish is now removed. On the south side of Machinery Hall things are in a quite unfinished condition as yet. The men with their drilling apparatus, and the full-sized blast furnace, have not as yet put in an appearance. Everybody feels inclined to criticise the walks. We suppose the Commission gave the contracts for making these to those whom it supposed were capable of doing good work, but if so, they have been deceived. Both the method of construction and the material used have been unsuitable for the purpose in almost every case. These pavements are nearly all laid in gravel quoted with tar. Those which are used for teams, as well as those for pedestrians, have not been made with sufficiently deep stone foundation, and in consequence are now filled with ruts and depressions which, after rain, serve as so many traps for the unwary. Some of the others have been laid in so much tar that in moderately warm weather one is likely to get stuck in their tracks without even—like LOT's wife—committing the indescretion of looking back. Several of the worst made of these walks have been recovered, but even now it is to be feared that the hot summer sun will convert them into quaking bogs. The pavement around the Government Building, which is made with a top dressing of cement, and also several in which the tar has been largely replaced by asphaltum and rolled down by heated rollers, seem to be very good.

The West End Narrow Gauge Railroad, which runs round the grounds, commenced running regularly this week, and, considering the number of visitors, has been well patronized. Nearly all the line has been inclosed with a wire fence, but on days when great crowds are present much care will have to be exercised to prevent accident at the numerous crossings. All the annexes and



other unfinished small buildings are so far advanced that two weeks more, if actively employed, ought to suffice for their completion.

Inside the Main Building, the feverish activity which was shown for a few days preceding the opening has been succeeded by much more leisurely action on the part of those who were not then ready. As was stated last week, the United States were about ready, so that but little has been done in that department during the week except that relating to the care of the exhibits. In the Mineral Annexes some work has been done, and there are already several fine displays, but the work there should be hurried along faster than it has been. France is still in great confusion, but as she does not include in her exhibits much that interests our readers, we won't get impatient about it. The Russians have just arrived, and are busily engaged in preparing cases, etc., for their exhibits. As they have about a hundred church holy days in the year besides Sundays, they will require some time yet to get ready. Turkey and Portugal are in an almost equally backward condition. China and Japan have their space well filled up with very artistic works in metals and lacquer, which attract the largest crowds in this building.

Adjoining these countries are the exhibits from Chili and the Argentine Republic, that of the first-mentioned country being in a forward state of completion.

One of the mineral collections from Chili is a remarkably fine one, containing many superb specimens of natural silver and silver ores.

The Swedish collection of irons and steels is now nearly completed, and, owing to the system which has been used in its arrangement, its compactness and its variety, it emulates our own exhibit of the same metals. The Civil Engineer's rooms in the West Gallery are nearly ready.

Among the many drawings and photographs which are displayed, there is a set of pen shaded drawings of the Bessemer Steel Plant at the Bethlehem Works, belonging to Mr. HOLLEY. We had hoped to see among the models the small converter used by KELLY, whose experiments on the decarburization, of iron were very similar and cotemporary with those of Bessemer. In Machinery Hall, the German and French departments are getting ready very deliberately. As in the Main Building, France makes no metallurgical or mineral display, the small one which it has being crowded off to Agricultural Hall.

The KRUPP exhibit in the German section is slowly being unpacked, but seems to lack the inspiration which the 57 ton gun will give when it is brought up from the vessel *Essen*, which lies in the Schuylkill about two miles from the buildings. The glittering monument of spiegeleisen, over twenty feet high, with its base made of lumps of spathose ores, all from the Siegen iron district, forms one of the most striking exhibits in the east end of the building. In the English department there will be a very good display of coal cutting machines, but one of which, that of WM. BAIRD & Co., of Gartsherrie, Scotland, is yet unpacked. The mining and other pumps are most of them well at work, and make the large tank in the hydraulic annex, look not unlike the grand fountains at Versailles on a gala day. COXE BROS. & Co., have just finished the erection of a model of a coal breaker, the arrangement of which is very good. The Nevada quartz mill, which occupies one of the avennes on the south side of the Machinery Hall, has already got its five stamp battery and amalgamating pans set up, and as a large number of bags containing ore are also on hand, "cleaning up," and distillation will soon be in order.

The official catalogues of the various exhibits made their appearance on the opening day, and since that time have been made the subject of much adverse criticism. Two volumes are devoted to the Main Building, one to Machinery Hall, which includes its annexes, the Government Building, Women's Pavilion, and, in fact, all other buildings excepting the Art Gallery and Agricultural Hall with their annexes. The Art and Agricultural departments have each a separate catalogue. They are all printed in uniform, small octavo form, on tinted paper, the type being small but quite good. The separate volumes are bound in pasteboard, which, by its constant disposition to curl up, to say nothing of the dirty appearance which it soon assumes, renders it unpleasant for those who have to use them constantly.

A cloth-bound volume, which contains all the catalogues, has just appeared, which will prove much more satisfactory for use. A quite serious inconvenience to their ready use results from the interleaving of advertisements through all the catalogues. Fortunately, however, the catalogue proper is never printed on the same leaves, so that with a little trouble one can soon rid the books of this offending material. Although the conception and carrying out of the Exhibition has been on a grand scale, that of the catalogue certainly has not been. It is a model of brevity and condensation, perhaps too much so. The exhibitors have been obliged to confine the description of their exhibits to twenty or less words, which many of them say does not allow a proper idea to be given of what they have to show.

The catalogue of the Main Building, with its over seven thousand exhibits, only occupies in consequence three hundred and forty six pages, of which nearly a hundred are taken up with statistical prefaces of the various exhibiting countries. The latter are well written and add much to the value of the catalogue.

So much complaint has been made by the exhibitors with regard to the short descriptions which they have been obliged to give of their goods that the Commissioners in charge of the catalogues have concluded to allow in future editions extensions at the rate of twenty-five cents per word. Should this permission be given without restriction as to the character of what is written, the new catalogues may become worse than the old, by being made bulky and unwieldy by the introduction of puffs and advertisements. The Main Building catalogue is divided into the three general departments of Mining and Metallurgy, the Department of Manufactures and the Department of Education and Science.

The first of these departments embraces those exhibits which more particu-

larly interest the readers of the JOURNAL, and its arrangement and classification will be somewhat fully described. For convenience of cataloguing, three general divisions are made in this department, which include twenty-two of the classes to which certificate awards are to be made by the Judges appointed by the Commission.¶ The first of these divisions include minerals, ores, stone, and mining products, the second metallurgical products, and the third mining engineering models, maps, and sections. The different classes embraced by these are as follows.

Class 100.—Minerals, ores, etc.—metallic and non-metallic minerals, exclusive of coal and oil; collections of ores and associated minerals; geological collections.

Class 101.—Mineral combustibles; coal, anthracite, semi-bituminous, and bituminous, coal waste, and pressed coal; albertite, asphalt, and asphaltic limestone, bitumen, mineral tar, crude petroleum.

Class 102.—Building stone, marbles, etc., rough, hewn, sawn, or polished, for buildings, bridges, walls or other constructions, or for interior decorations or for furniture; marble—white, black, or colored—used in building, decoration, statuary, monuments, or furniture, in blocks or slabs not manufactured.

Class 103.—Lime, cement, and hydraulic cement, raw and burned, accompanied by specimens of the crude rock or material used, also artificial stone, concrete, beton. Specimens of lime, mortar, and mixtures, with illustrations of the process of mixing, etc.; hydraulic and other cements; beton mixtures and results, with illustrations of the processes; artificial stone for building purposes, building blocks, cornices, etc.; artificial stone mixtures for pavements, walls or ceilings; plasters, mastics, etc.

Class 104.—Clays, kaolins, silex, and other materials for the manufacture of porcelain, faience, and glass; bricks, terra cotta, tiles, and fire-brick; refractory stones for lining furnaces, sandstone, steatite, etc., and refractory furnace materials.

Class 105.—Graphite, crude and refined, for polishing purposes, for lubricating, electrotyping, photography, pencils, etc.

Class 106.—Lithographic stones, hones, whetstones, grindstones, grinding and polishing materials, sand, quartz, garnet, crude topaz, diamond, corundum, emery in the rock and pulverized, and in assorted sizes and grades.

Class 107.—Mineral water, artesian well water, natural brines, saline and alkaline efflorescences and solutions, mineral fertilizing substances, gypsum, phosphate of lime, marls, shells, coprolites, etc., not manufactured.

Class 110.—Precious metals.

Class 111.—Iron and steel in the pig, ingot and bar, plates and sheets, with specimens of slags, fluxes, residues and products of working.

Class 112.—Copper in ingots, bars, and rolled, with specimens illustrating its various stages of production.

Class 113.—Lead, zinc, antimony, and other metals, the result of extractive processes.

Class 114.—Alloys used as materials, brass, nickel, silver, solder.

Class 120.—Surface and underground surveying and plotting; projection of underground work; location of shafts, tunnels, etc.; surveys for aqueducts, for drainage, for ascertaining the nature and extent of mineral deposits, boring and drilling rocks, shafts, tunnels, etc.; construction, sinking, and lining shafts by various methods; driving and timbering tunnels, and the general operations of opening, stoping, and breaking down ore; timbering, lagging, and masonry; hoisting and delivering at the surface rock, ore, or workmen; pumping and draining by engines, buckets, or by adits; ventilation and lighting, subaqueous mining, blasting, etc.; hydraulic mining and the various processes of sluicing and washing auriferous gravel and other superficial deposits; quarrying.

Class 121.—Models of mines, of veins, etc.

Beside these classes, which make up the Department of Mining and Metallurgy, the following, which are in the other departments, are directly connected with the same subjects, viz.:

Class 204.—Explosive and fulminating compounds, in small quantities only, and under special regulation shown in the building only by empty cases and cartridges; black powder of various grades and sizes; nitroglycerine and the methods of using and exploding; giant powder, dynamite, dualine, trinitroglycerine.

Class 207.—Fire-clay goods, crucibles, pots, furnaces, chemical stoneware.

Those just given are in the Department of Manufactures and in the Department of Education and Science.

Class 320 includes geodetic and surveying instruments, transits, theodolites, needle compasses; instruments for surveying underground in mines, tunnels and excavations.

In the Department of Machinery the mechanical agents used in metallurgy, mining, manufacturing, chemistry, and gas-making are included in the classes given below:

Class 500.—Rock drilling.

Class 501.—Well and shaft boring.

Class 502.—Machines, apparatus, and implements for coal-cutting.

Class 503.—Hoisting machinery and accessories.

Class 504.—Pumping, draining, and ventilation.

Class 505.—Crushing, grinding, sorting, and dressing. Breakers, stamps, mills, pans, screens, sieves, jigs, concentrators.

Class 506.—Furnaces, smelting apparatus, and accessories.

Class 507.—Machinery used in Bessemer process.

Class 508.—Chemical manufacturing machinery, electroplating, paint and powder mills, blacking and soap making machinery.

Class 509.—Gas machinery and apparatus.

Class 512.—Rolling mills, bloom squeezes, blowing fans, rivet, nail, bolt, and tack making machinery.

Class 513.—Furnaces and apparatus for casting metals, with specimens of work, anvils, forges, bellows.

Class 560.—Pumps and apparatus for lifting and moving liquids.

Class 561.—Pumps and apparatus for moving and compressing air or gas.

Class 562.—Pumps, and blowing engines, blowers and ventilating apparatus.

The exhibits in each of the above classes will be specially studied by the judges who have been appointed by the Centennial Commissioners, for the purpose of making awards to the more meritorious displays.

Two hundred and twenty-five judges are to appointed, one hundred of whom are nominated by the different foreign governments represented in the Exhibition, while the remaining one hundred and twenty-five are chosen by the Centennial Commission.

The American judges have all been appointed, and in nearly every instance accepted.

The judges have been selected for their fitness, with reference to twenty-eight different classes.

In another column will be found a partial list of the judges in those departments in which the readers of the JOURNAL are interested. The names of all the foreign judges have not yet been published.

The Centennial Commission have decided on a different system of making awards from those which have been followed in all previous World's Exhibition. No medals of any kind will be given, but instead certificates will be granted to the most meritorious exhibitors in which will be stated the particular qualities in which their exhibits excel. These certificates will be signed by the judges of the different classes to which they belong, and in them will be set forth the particulars in which the exhibits are thought to excel. The advantages which this system of awards will have over those hitherto pursued can readily be seen. The gold and other medals which have been given at former World's Exhibitions, although indicating merit in the things for which they were awarded, did not show exactly in what this merit was thought to consist. The certificates which are to be awarded at our exhibition will, on the contrary, clearly indicate the reasons for which they are given, and being signed by the judges themselves will have the weight of their authority. They expect to commence their examinations on the 24th of this month, and hope to have their work finished by July 4th. The magnitude of their labors will, however, probably prevent them from being ready by that time.

OLIVER'S PATENT BLASTING CARTRIDGES AND POWDER-MAKING MACHINERY.

THE value of an improvement or invention is, by no means, proportional to the cost of the article produced. This is well illustrated in the simple little contrivance adopted by Gen. P. A. OLIVER, in making blasting cartridges for the use of miners and quarrymen. Every one who has had experience at the mines must have noticed the wasteful and inconvenient manner in which cartridges are prepared. A miner makes his own, using about twice as much paper, etc., as is necessary, his own time being worth from $2.50 to $3 a day; the cost of manufacture amounts to many times what it would if made by machinery, as are many similar articles. When the ground is wet he has to use soap also, to make his cartridge waterproof; even then he is very often far from successful, and loses a portion of his powder by getting it wet.

OLIVER'S cartridge is made by machinery; those for dry ground have the end rivetted with a copper or tinned rivet, and those for wet holes have the end formed of a double cup of tin, one setting into the other, and holding the paper of the cartridge between them. The cartridge is then coated with a waterproof coating, and is ready for use. They are made of various lengths, so that the miner has rarely to cut one, and if he has, the loss is, at most, but a few inches of paper. Manufacturing them on a large scale, the patentee can sell them at much less than it costs a miner to make his cartridge himself.

General OLIVER, the manufacturer of this ingenious and useful article, has met with great success in the manufacture of powder by his patent machinery, having, during the past five years, fully established the reputation of his powder as having no superior for strength and effectiveness, and of his method of manufacture, for simplicity, safety, and economy. In his mill there is never, except in the drying-house, more than some 50 or 70 lb. of powder in any one place, so that should it ignite, nothing more serious can result than the loss of a few pounds of powder. His well-ordered works, near Wilkes-Barre, Pa., with its beautiful machinery, is one of the most interesting establishments with which we are acquainted, and General OLIVER has deserved well in devising a method of manufacture, by which powder, of a quality not surpassed by that of any other maker, not only can be, but has, for some years, been produced almost without risk, and at a cost for plant greatly less than in ordinary powder mills. His improvements are well worthy the attention of powder manufacturers everywhere.

TAYLOR'S TABLES FOR RAILROAD OFFICES.—One of the most useful books we have seen for some time past is a volume of 550 folio pages of tables adapted for use in calculating freight and passenger returns, percentages, etc., etc. The number of the page is the common multiplier and the subjects it is used to represent are as numerous as the rates charged and the items calculated in a railroad office. These tables were originally compiled to facilitate calculations of tonnage per mile, on the several divisions of the Pennsylvania Railroad but they are applicable to other calculations, and are daily used by this company in proving the correctness of manifests or way bills, ticket reports, percentages, etc., etc., and enable clerks to despatch more work, and with confidence as to absolute correctness. They give the multiplication on each page from 1 to 999 of the page number, from 1 to 550, 225, or 120 respectively.

Mr. TAYLOR, having received numerous inquiries as to how copies of these tables can be obtained, has arranged to furnish them printed on parchment paper, with substantial binding at the following prices:

550 pages $50; 225 pages $35; 120 pages $25. Address, WILLIAM TAYLOR, 233 South Fourth Street, Philadelphia.

We cannot imagine anything more useful in a railroad auditor's office than this book of tables. They have a peculiar value in having been thoroughly revised and are believed to be absolutely free from error. It is not, however, in railroad offices alone, that they will be found of great value, but at the mines, furnaces, and elsewhere, where pay rolls and other tedious calculations have to be made. They simplify the work by reducing the operation to additions, just as in multiplications by the use of logarithm tables, which they resemble.

PREVENTION AND EXTINCTION OF FIRE ON BOARD SHIPS.—At a recent meeting of the chemical section of the Glasgow Philosophic Society, a paper on this subject was read by Mr. D. CARGILL, Dundee. He referred first to the ventilation of ships, and said:—Before cargo is put on board, place planks along the bottom of the hold to make an open space about one foot square; lead a three-inch diameter cast-iron pipe from this open space to deck, which can be closed with plug screw flush with deck till wanted; have one of these pipes every 50 feet length of ship. On deck have an ordinary blast-fan about 12 inches diameter, may be more or less as required; attach to this fan one end of a flexible hose, an ordinary three-inch canvass hose will do; the other end attach to the top of the cast-iron pipe. When ventilation is wanted, work the fan by hand, wind, or steam-power, which will blow through the ship any quantity of air to purify the gas arising from coal cargo, or expel any sweat arising from other cargoes. As to the means of preventing fires by counteracting the ignitable and inflammable tendency of gas-emitting cargoes, Mr. CARGILL said:—For this purpose an earthenware, fireclay, or metal vessel, or even an empty cask, is placed upon the deck or at any other convenient part of the ship into which a quantity of broken chalk, marble, bicarbonate of soda or other carbonate is placed. The vessel is formed with two openings or necks, but any suitable form of vessel may be employed. To one neck a flexible pipe, composed of gutta-percha or other suitable material is attached and secured to a vertical pipe. Into the other neck or opening of the vessel a syphon pipe, formed with a funnel or mouth at its outer end, is inserted; and it, together with the flexible pipe, is luted with putty, or otherwise fixed in a manner to prevent escape of gas from the vessel. Through the syphon pipe a mixture of sulphuric or muriatic acid and water, acid salt, or dry acid dissolved in water, is poured into the vessel, which mixture, acting on the chalk or other carbonates, liberates carbonic acid gas, which is conducted through the flexible pipe into one of the vertical pipes, and is thereby conducted to the bottom of the ship's hold, where combining or commingling with the gases arising from the coal, or other gaseous or inflammable cargoes, the carbonic acid gas destroys the combustible tendency.

COLORADO.

Special Correspondence of the Engineering and Mining Journal.

FROM THE MINES OF GILPIN COUNTY—INTERESTING FACTS, FIGURES AND STATISTICS.

MINING affairs in the gold district, in and around Central, continue to improve, and there is a steady increase in the amount of ore crushed and of bullion produced. Eighteen mills with 519 stamps have been running steadily in this district for several months. But these are found entirely inadequate for the demands of the mines, whose ore product is rapidly growing larger. Several mines have been started up lately, and many more will be, on which but little work has been done recently. Seven idle mills are being put in order for work, and all will be in operation within two weeks, and others are being enlarged. Before the middle of May twenty-five mills with 757 stamps will be grinding out the bullion from a hundred or more lodes, and better times may be looked for than have been known here for years. It is said the above is a larger number of stamps than were ever at work here at one time. Two of the old mills, containing altogether 40 stamps, are being shipped from here to the Summit Mountain gold mines of the San Juan country.

The most accurate figures yet attainable show the export of gold from Central for the three months ending April 1, 1875, to have been $493,188.51. This is ahead of the corresponding months of any previous year of which statistics are furnished. The yield of the first quarter of the year is always much smaller than any that follows it.

Of the above amount $344,188.51 came from the stamp mills, and $149,000 from the Boston and Colorado Smelting Works. This does not include the silver and copper obtained from Gilpin County ores produced by these works, the silver always amounting to about 20 per cent. of the yield of the ores handled there. Nor is any allowance made for small lots of ore bought at Golden, or of bullion sent through other channels, etc. But there is enough gold from ores brought from other countries in this $149,000 to make the above very near the actual yield of Gilpin County Mines. At the end of the year an accurate statement will be given by these works. The mill gold given above is accurate.

The value is obtained in this way: The number of ounces of bullion sent through the banks is obtained. The average fineness for the whole district is known to be ·787 gold, ·198 silver and ·015 copper. On this basis and counting gold at an average premium of 1.13½ for the three months, and silver at 1.00 or 1.15 an ounce, and copper at 30 cents a pound, the currency value is attained. In this manner the bullion figures of last year for this country were obtained—allowing a higher rate for gold.

March, 1876, shows the largest yield of any month of which we have any record. It was $199,300.22, of which $144,300.22 was from the mills, and $55,000 from the smelting works. August, 1869, is credited with $161,000 in mill gold, but the smelting product was less than that of last month.

The currency value of the bullion from the stamp mills in these three months was as follows—gold 1.13½:

January	$99,232.40
February	100,578.18
March	144,300.22
Total	$344,110.80

For the same months in 1875—gold computed at 1.16—the currency value was

January	$99,933.33
February	72,868.30
March	87,610.05
Total	$260,411.68

Increase of first quarter of 1876 over first quarter of 1875, $83,699.12, or about 25 per cent. If this rate of increase is maintained throughout the year the bullion yield of Gilpin County would reach $2,200,000 as against $1,763,985.48 last year. But from preparations for extensive operations in various quarters outside of those mines that have been producing largely, there is reason to believe the yield will be much larger.

The Gregory lode is being worked by about the same force as last year. The ore is, and has been of unusually low grade, but there is plenty of it. The deep shaft that is being driven on the Briggs part of the Gregory, 40 feet long by 10 wide, is down 700 feet. Levels will soon be run through the properties west, where much greater depths will be attained. About 45 tons of ore are handled daily by the BRIGG'S Brothers, and 30 by the New York and Colorado Company (old SMITH & PARMELEE) ninety stamps, and nearly 200 men are employed in the mines and mills. The BRIGG'S Brothers operate their original 240 feet, the 300 feet west, that they bought from the Black Hawk Company, and 500 feet known as the Consolidated Gregory. The latter, as yet, has produced but little.

Further up the hill, the Narragansett property is worked by SULLIVAN, SMITH & Co., under lease—shaft 500 feet, with about 20 men employed. The New York and Colorado shaft is being sunk steadily, and is down 650 feet. The lode for 2,240 feet is being opened systematically, and for the future operations, and but little if any money has been cleared lately unless possibly on the Briggs, owing to dead work, new machinery, etc.

The yield of the Gregory for last year was:

New York and Colorado		$76,310 75
Briggs { mill gold	$100,146 57	134,634 10
Briggs { received from the smelting works	34 487 53	
Narragansett, estimated		25,000 00
		$235,944 85
Value of smelting ore not given above, etc		25,000 00
		$260,944 85

The smelting ore is sold at from $40 to $120 per ton, but, of course, has an actual value of from $85 to $170 to renumerate the smelter. The New York and Colorado mill and smelting gold are included in the above. The product of this mine was previously over estimated by the writer, owing to having seen statements of a few of the best months only. The average of the Briggs smelting and mill ore taken together last year was $8.64 per ton.

The Bob Tail Company's mine and mill employ together 140 men, and this force will soon be increased. The ore comes from below the tunnel level, which is 500 feet below the outcroppings of lode on the hill side above. Below the tunnel a double shaft 6x16 feet is being driven, and has reached a depth of 150 feet. Cages are to be used for hoisting ore instead of buckets. Levels are being run east and west from this shaft, to open up the entire property. The ore is of lower grade than usual. The mill ore usually yields $10 per ton, after about one-tenth has been selected for smelting.

In 1875, about 75 stamps were usually run on this ore, crushing 60 tons daily. In addition to this, a large quantity of ore was held in reserve in the mine, that will be treated hereafter. The mine was brought into working shape in May. The total yield of 1875, was $207,000. The yield of the mine for the three months ending April 1st, 1876, was $68,050, that of March being $26,200. The Black Hawk mill purchased by this company, was rebuilt internally last year, and has no superior in the country. It contains 75 stamps. The Sensenderfer and Eagle mills, each of 20 stamps and owned by this company, have been idle since the completion of the Black Hawk mill, but will be run by water power after the first of May. This will make 115 stamps at work instead of 75 as heretofore, and the bullion yield will be increased proportionally, and may reach $400,000 for the year following this date. This company has absorbed nearly all of its neighbors, and owns 900 feet of continuous ground in the developed part of the lode, less 33½ feet owned by FIELD.

This lode is worked and is paying well outside of this company's property in three places. Their yield of, perhaps, $10,000 last year, may reach $50,000 this year. These claims are H. W. LAKE'S on the west, No. 8, bought by LAFRENZ of the Black Hawk Company, that is quite rich, and HOLMAN'S property east of the big cross lode. The latter has lately yielded 28 ounces of gold to the cord. Its shaft is being driven to reach a depth of 250 feet.

The Gunnell is thought to be yielding as much or more than the Bob Tail, but no figures are attainable at present. The ore averages from $18 to $20 per ton.

The Ophir-Burroughs shaft is 1,000 feet deep, with good ore in the bottom. Less has been done on the Kansas, owing to improving the shaft, etc.

The Buell Mine is clear of water, and the work of sinking to attain a depth of 1,000 feet has begun.

F.

FURNACE LININGS.

TO THE EDITOR: Sir—Permit me to make a suggestion as to a first-class furnace lining for all metallurgical purposes. I am at present putting it into practical use. I am making, with a common hand brick-press, fire-bricks consisting *to two-thirds of their length* of what refractory material I select for the special purpose or special place (fire clay, or 39-40 quartz sand, and 1-40 caustic lime), and the head ⅓ of the fire-brick (eventually the side), is partially made of a layer of mixed plumbago (product of New Mexico); next to the common material, and partly of a layer of clean plumbago, forming the head (face) of the fire-brick. I thus get a fire-face in my furnaces of pure plumbago, with about two ounces of plumbago to the square inch, or one hundred feet square of fire-face are formed by one ton of plumbago, with an outlay of fifty cents per square foot here, and of not more than one dollar anywhere in the East. The manufacture of these bricks is secured by patent, but as the owners of the New Mexican plumbago mines control the patent, the manufacture is free whenever the plumbago has been purchased from them. A slag furnace thus constructed with plumbago-headed and plumbago-sided fire-bricks, has all the advantages of a plumbago crucible for non-affinity of the materials, and for resistance against fire.

F. M. T. CAZIN, M. & C. E.

SANTA FÉ, N. M., May 8, 1876.

EXCELLENT WORK OF THE BANGOR AND BAY FURNACES, MICH.

(For the Engineering and Mining Journal.)

By Chas. E. Wright, M. E.

DURING the past year a friendly rivalry has existed between the Bangor and Bay Furnaces, each striving to do the best work. The former is located at Bangor, in Lower Michigan, and the latter at Onota, on Lake Superior, Michigan, some forty miles east from Marquette. These furnaces are smelting the iron ores from our Lake Superior iron mines, and use as flux the Kelly Island lime-stone—the only difference being in the quality of the charcoal and temperature of hot blast.

Their dimensions are practically the same, viz., 9½ feet across the boshes, and total height 45 feet from bottom of hearth to fill plate. As the record of these furnaces for ten months is ahead of any furnace I have seen noticed as working under similar conditions, I have thought perhaps the following description might prove interesting to some of our charcoal iron-makers. I have no analyses of the gases, but have made several of the ores, fuel, limestone, cinder, and pig irons, so that the calculated analysis of the gases, no doubt, will approximate very closely to their actual composition. I have employed in these gas calculations GRUNER'S method, but have used the numbers adopted by BELL in his excellent work on "Iron Smelting."

The following brief statements were kindly furnished by HENRY FORD, Esq., General Manager and Secretary of the Bangor Furnace Company, and Major H. S. PICKANDS, Superintendent of the Bay Furnace Company, who have won a well-merited reputation as charcoal iron makers:

BANGOR FURNACE.

Went into blast June 1st, 1875, and for the ten months ending March 31st, 1876, we have the following:

	Tons.	
Specular ore consumed. New York, Cleveland, Jackson, and Lake Superior Mines	11,396	418-2240
Soft hematite ore consumed. Winthrop, South Side, and McComber Mines	3,365	2026-2240
Limestone consumed. Kelly Island	708	1840-2240
	Bushels.	
Charcoal consumed. One-fifth soft wood, and four-fifths hard wood. (Weighs 19 lb. to the bushel)	992,350	
Bushels to the charge	25	
	lb.	
Average lb. ore to the charge	833⅓	
Pressure of blast	2¾	
Temperature of blast	700° F.=370° C.	
" " gases*	100° C.	

PIG IRON MADE.

	Tons.
No. 1, Bessemer	7,079
" 2, "	1,526
" 3, Car wheel	402⅔
" 4,	152⅔
" 5,	229
Gross	9,389

* Assumed.

BAY FURNACE—NO. 2 STACK.

For the ten months ending March 23, 1875, we have the following details :

Furnace blown in (on a patch) May, 25, 1875, and "banked up" March 24, 1876.

Specular ore consumed—Cleveland, New York, Jackson, and Lake Superior Mines	10,219 tons.
Hematite ore consumed—McComber, Winthrop, Rolling Mill, and Grand Central Mines	5,033 "
Limestone consumed—Kelly Island	625 "
Charcoal consumed—⅓ hemlock, and ⅔ maple and beach (charcoal weighs 17 lb. to the bushel)	1,003,620 bus.
Bushels coal to the charge	30
Average lb. ore	1,050
Pressure of blast	2½ lb.
Temperature of blast	500°F. = 260°C.
" of gases	100°C.

PIG IRON MADE.

No. 1. Bessemer	7,394⅛	gross tons.
" 2. "	1,676¼	" "
" 3	182	" "
" 4	36¾	" "
" 5	14	" "
	9,303⅛	gross tons.

In the succeeding tables of each furnace the first column exhibits, for the ten months, the average amount of stock used to produce one ton of pig iron ; the second column, the elements of the crude metal ; the third, the composition of the slag ; and the fourth column, the gas derived from reduction and decomposition of raw material.

BANGOR FURNACE.

Raw Material per ton of Pig.	Pig Iron.		Slag.		Gas.	
	Pounds.					
Specular Ore	2,700					
Per cent.						
92·00 Fe_2O_3	2,484	1,690	Fe.	62 FeO	732	O
7·50 SiO_2 & C	203	30	Si.	139	34	O
·50 H_2O	13				13	H_2O
Soft Hematite	800					
81·00 Fe_2O_3	648	454	Fe		194	O
15·00 SiO_2 & C	120			120		
4·00 H_2O	32				32	H_2O
Limestone	169					
77·00 $CaOCO_2$	130			73 CaO	57	CO_2
20·00 $MgOCO_2$	34			16 Mg.O.	18	CO_2
3·00 SiO_2 & C	5			5		
Charcoal	2,008					
80·00 C	1,606	66	C		1,540	C
3·00 Ash	60			60		
17·00 H_2O & Vol.	342				342	H_2O & Vol.
Solid material	5,677	2,240		475	2,962	
Blast					6,500	
Total gases					9,462	

BAY FURNACE.

Raw Material per ton of Pig.	Pig Iron.		Slag.		Gas.	
	Pounds.					
Specular Ore	2,463					
Per cent.						
91·43 Fe_2O_3	2,251	1,527	Fe.	62 FeO	662	O
8·07 SiO_2 & C	200	30	Si.	136	34	O
·50 H_2O	12				12	H_2O
Soft Hematite	1,211					
72·80 Fe_2O_3	881	617	Fe.		264	O
27·20 SiO_2 & C	269			269		
5·00 H_2O	61				61	H_2O
Limestone	150					
77·00 CaO CO_2	115			64 CaO	51	CO_2
20·00 MgO Co_2	30			14 Mg.O	16	CO_2
3·00 SiO_2 & C	5			5		
Charcoal	1,833					
80·00 C	1,466	66	C		1,400	C
3·00 Ash	55			55		
17·00 H_2O & Vol.	312				312	H_2O & Vol.
Solid materials	5,657	2,240		605	2,812	
Blast					6,000	
Total weight of gases					8,812	

HEAT REQUIREMENTS, ETC.

In this we will adopt the number of calorics absorbed per unit of reduced material, made use of by BELL for reduction, etc., viz.: reduction of Fe_2O_3 1780 calorics ; silicon, and other elements of pig metal, 7,000 calories ; evaporation of water in stock, 540 calorics ; decomposition of moisture in blast, 3,778 calorics ; expulsion of carbonic acid from limestone, 370 calorics, etc. Also calorics evolved per unit of carbon by oxidation, as follows :

C to CO 2400 calorics ; C to CO_2 8,000 calories ;
C to CO_2 and 2 CO to CO_2 + C 3,200 calorics.

BANGOR FURNACE. HEAT REQUIREMENT.

Reduction of Fe_2O_3	·144×1780	3,806
" " SiO_2	·030×7000	210
Fusion of pig	·240× 330	739
" " slag	·475× 550	268
Expulsion of CO_2 from limestone	·169× 370	62
Decomposition of H_2O in blast	6·500×3778×·0062	152
Evaporation " " " " stock	·045× 540	25
Sensible heat of gases	9·500× 24×100°	230
Loss from radiation, tuyeres, water, etc		300
		5,792

Calorics from blast ..... 6·500× ·237×370° = 570

Total calorics from fuel 5,232

C to CO 1·540×2400 3,696

CO to CO_2 1,536

$\frac{1·526}{5·600}$ = 272·4 lb. C burnt to CO_2

$\frac{272·4×11}{3}$ = 997 CO_2 = 724 Oxygen.

CO_2 from limestone ..... 75 "

Total CO_2 in gases ..... 1072 "

" CO " " $\frac{1267·6×7}{3}$ = 2958 CO = 1,690 Oxygen.

" Oxygen in gases ..... 2,414 "

" " from reduction ..... 960 "

" " " blast ..... 1,454 "

$\frac{1454}{·23}$ = 6,300 lb. of air to make one ton of pig metal.

$\frac{960×3}{4}$ = 720 lb. carbon in CO required for reduction.

$\frac{720×11}{3}$ = 2,640 CO_2 generated in zone of reduction.

997 CO_2 found in gases derived from fuel.
1,643 CO_2 reduced to CO. ($CO_2 + C = 2CO$.)

$\frac{1643×3}{11}$ = 448 carbon burnt near top of furnace.

Hence 1540 - 448 = 1092 " " in hearth to CO.
C to CO as found in gases, 1267·6×2·400 = 3,042
C to CO_2 " " " " 272·4×8·000 = 2,179

Calorics evolved from fuel 5,221

Hence for each lb. of carbon consumed in the furnace are $\frac{5221}{1·450}$ = 3,600 calorics.

TOTAL HEAT UNITS EVOLVED PER 1000 LB.

C to CO	1092×2·400 = 2,621	calorics from C burnt in hearth.
CO to CO_2	720×5·600 = 4,032	" " " " " red. zone.
	570	" " hot blast.
	7,223	

TOTAL HEAT UNITS ABSORBED PER 1,000 LB.

	5 792 calories per heat requirement table.
448×3·200	1,433 caloric absorption from CO_2 —C=2 CO.
	7,225

Applying the above formulæ, and proceeding in a similar manner with the Bay Furnace, we obtain the following results :

Heat requirement ..... 5·772 calorics.
Hot blast furnaces ..... 388 "

Leaving for fuel to supply ..... 5·384 "

Carbonic acid from burning of carbon ..... 1,325 = 964 oxygen.
" " " " limestone 67

Total " " in gases 1,392
" Carbonic oxide in gases ..... 2,423 = 1,384 "

" Oxygen in gases from fuel 2348
" " from reduction 960

" " " blast ..... 1,388 lb.

$\frac{1388}{·23}$ lb. = 6,000 lb. air to each ton of iron made.

720 = Carbon in CO from reduction burnt to CO_2
2,640 = CO_2 generated in zone of reduction.
1,325 = " found in gases derived from fuel.
1,315 = " reduced to CO by the action of CO_2 + C = 2CO.

$\frac{1,315×3}{11}$ = 358 5 carbon burnt in upper portion of furnace.

1,400—358.5 = 1041·5 " " " hearth.

C to CO as found in gases 1,038·6×2·400 = 2·493
C to CO_2 " " 361·4×8·000 = 2·891

Calorics derived from fuel 5.384

Hence, for each unit of carbon burnt in the furnace, there is evolved $\frac{5,384}{1·400}$ = 3.842 calorics.

Total heat units evolved per 1,000 lb.:

C to CO	1 0415×24,00 = 2,500	calorics from C burnt in hearth.
CO to CO_2	·720×5 600 = 4,032	" " " " in red zone.
	388	" " hot blast.
	6,920	

Total heat units absorbed per 1 000 lb :

	5,772 calorics from heat requirement.
358·5×3200	1,148 caloric absorption from CO_2 + C = 2CO
	6,920

BELL, in his work, concludes, from actual experiment with Cleveland ores, that when a mixture of CO_2 and CO, is in the proportion by weight of 80 of the former, and 100 of the latter, its reducing power at a low temperature is practically exhausted.

Assuming this ratio as that of our "ideal action," which I believe will yet be attained in charcoal furnaces, smelting our rich Lake Superior iron ores—requiring, as they do, so little limestone as flux—we will proceed to examine how closely the two furnaces under consideration approach the above ideal working:

100 CO contains 42·85 carbon
80 CO_2 " 21·82 "
3·30 " " ·90 "

which latter corresponds to the average amount of carbonic acid of the limestone used with this mixture.

We have 21·82—·90=20·92,
hence, 20·92×8·000=167·360 calorics.
and 42·85×2·400=102·840 "
63·77 270·200

Therefore each unit of carbon in our ideal action would generate $\frac{270·200}{63·77}=$ 4,235 calorics.

In the Bangor Furnace we had 3,600 calorics from each unit of carbon.

Hence, $\frac{3600}{4235}=·85$ per cent., and for the Bay Furnace we have $\frac{3842}{4235}=·91$ per cent.

That is, the Bangor Furnace with the same temperature of blast might possibly save 15 per cent. more fuel than it now does, and the Bay Furnace, under same conditions, 9 per cent.

The source of the greater loss of fuel in the Bangor Furnace than in the Bay Furnace lies, as may be seen, in a larger reduction of CO_2 in the upper portion of the furnace. The cause of this is apparently somewhere in the construction of the upper part of the furnace. From the foregoing we conclude that while the Bangor Furnace is ahead about 1 per cent. in the amount of production, we have in favor of the Bay Furnace an average of 6 per cent. greater economy in the use of fuel.

FIRES IN COAL MINES AND THEIR EXTINCTION.

AT a meeting of the Manchester Geological Society, recently held, a paper on this subject was read by Mr. JOSEPH THOMPSON, F.G.S., Mining Engineer at the Norley Collieries, near Wigan.

Mr. THOMPSON, in the course of his paper, said: No doubt you are all as well aware as myself that these fires have several sources of origin; thus, in the event of an explosion of fire-damp, the coal may become ignited direct from the flame of the explosion, or the blaze may be communicated to the coal from burning brattice. An inexperienced or careless collier, after firing his shot, which (as not unfrequently happens) has lighted a feeder of gas, does not examine his place until the flame has attained serious proportions, and is difficult to subdue. A badly-planted shot may blow out and ignite the brattice, a negligent stoker at underground boilers may leave the ashes insufficiently damped, and various other contingencies may arise, all or any of which might account for the occurrence or existence of a fire. These fires also not unfrequently originate spontaneously, owing to chemical decompositions that occur not uncommonly at long distances from the shaft, and are, consequently, extremely difficult to control or extinguish, consequent on the absence of suitable appliances. In addition to the sources of underground fires already mentioned, I regret to think that some have been the work of incendiarism. Let the cause, however, be what it may, there is no doubt that the risk of fire, with all its attendant difficulties, constitutes a constant menace to those persons who are responsible for the safe working of our mines, and into whose hands the custody of valuable property is given. Naturally, the thought which first occurs to any person on hearing of a fire is as to the appliances there are at hand for throwing as bountiful a supply of water as is possible on the flames; but below ground it not unfrequently happens that a sufficient supply of water cannot be obtained, or that, a sufficient supply being at hand, the circumstances of the case are such that that supply cannot be thrown to the points where it is most needed. Steam, as well as carbonic acid, have been tried in some mines as extinguishers, with more or less success, and an apparatus called "L'Extincteur" was used some time ago, I believe, very successfully in the case of a mine which was on fire in the neighborhood of Wigan. Yet, notwithstanding all these appliances, underground fires many times attain such proportions that these means are entirely ineffectual, and there is then no course open except that of isolating the fire from the atmosphere by building dams or stoppings across every point of access to the region of the fire, or by sealing the pit shafts. Let me qualify my remark "sealing the pit shafts" by saying that what I mean should be done is that the down shaft should be close-sealed, and the scaffold on or in the upcast shaft have a hole left in it covered by a valve so constructed as to allow the egress of the volume of vitiated atmosphere produced by expansion, due to the excessive heat within the mine, and also by atmospheric changes, but which valve closes up the hole automatically as soon as there is a tendency for the air above the scaffold to rush inwards. It often happens, however, that the work of building walls or scaffolds in open places round the region of the fire is ineffectual, owing to the difficulty which is experienced in finding perfectly solid roof, floor, and sides against which to construct the dams or stoppings, as, in the event of there being a leakage in any point, combustion still goes on. For this and possibly other reasons, I think there is a tendency on the part of many engineers and colliery managers to incline to the idea of sealing the shaft, or shafts, as against the attempting of damming off the regions of the fire in cases where the fire has got the upper hand. I have heard of cases where no measures at all have been taken for the extinction of the fire, which has burnt on for a long period of years, but the value of mineral property is now so great that the unfortunate owners of any sealed-up mine are almost invariably only too anxious to have their mines re-opened as soon as possible, consistent with a due regard to safety. It is impossible, however, for any person to define what length of time is sufficient to be allowed to elapse before it is safe to re-admit fresh air and enter the mine. I need hardly mention that cases are on record where the re-opening has been commenced too precipitately, and most disastrous consequences have ensued. It will, therefore, be clear that the operation of re-opening a mine which has been on fire is one not unattended with considerable difficulties and risk, and any scheme which may be adopted for re-opening should be first very carefully matured.

Mr. THOMPSON, then, as a practical illustration of the methods used in extinguishing fires in coal mines, proceeded to describe what had been done in the case of a serious fire which had occurred at the Norley Colliery, near Wigan, with which he is connected as mining engineer, and where the operations consequently were carried out under his supervision.

The cause of the fire had since practically remained a mystery. It originated in or near to an underground engine-house, in what was known as the Onell Five-feet Mine, and near to the bottom of the downcast shaft, so that a strong current of air was constantly passing and materially assisting the fire in its course, during which it burnt away all the timber supports of the roof, which subsequently fell, making extremely difficult and dangerous the efforts to extinguish it by means of jets of water. Preparations were then commenced for isolating the fire from the fresh air, by means of dams or stoppings, but the difficulty of finding absolutely compact roof, floor, and sides was experienced, and as the fire was rapidly extending, and was now of a most formidable character, it was decided at once to seal up the downcast shaft at a short distance below the mouthing of an upper seam of coal. A couple of scaffoldings were erected across the shaft and covered with puddled clay and water. Through these scaffolds a five-inch cast iron pipe fitted with a valve and close-fitting lid was put on, by which means observations of temperature near the seat of the fire could be taken by letting down thermometers into the shaft. A covering was also put over the upcast shaft, and in this scaffold a hole six inches square was left covered by a hinged flap valve which yielded to the pressure from within, but closed immediately there was pressure from without. Observations were made in both shafts during the six months that the mine was closed, and the temperature rose and fell alternately between 89 and 76 degrees Fahrenheit, when operations for re-opening the mine were commenced. He considered it very doubtful how far observations taken under such circumstances were to be taken as a criterion as to what was going on in the pit, hence the very great uncertainty and danger which must attach to all operations for re-entering a mine which had been sealed up through fire. If he was correctly informed, the thermometer gave a reading lower than any which he obtained at Norley on the day on which the second explosion occurred at the Moss Pits at Ince, which displaced the whole of the sealing scaffolds, and rendered it necessary to flood the mines at once. He, therefore, assumed that when it was determined to re-open the Norley Pit, there was no possibility of knowing whether the fire was or was not extinguished, and the serious apprehensions entertained by most people who were concerned in the work were easily justifiable. Various schemes were discussed, but ultimately it was decided to approach the workings somewhat by stealth. They worked on unceasingly night and day until they had passed fresh cool air through a small hole in the upcast shaft, and until this air was passed over the seat of the fire and returned at the downcast shaft where it was tested. They then considered that they had, as Mr. DICKINSON termed it, felt the pulse of the mine, and as rapidly as possible took out the scaffold in the downcast shaft, and explored the mine with success.

DISCUSSION.

In the discussion, Mr. THOMPSON said that the fire had extended about 180 yards, and 14 to 15 inches deep into the coal, and where it had come in contact with cast or wrought iron, it had fused into one mass.

Mr. KNOWLES said that at various times they had had experience of fires in their collieries, and their plan had been to get to the site of the fire as soon as possible. The most serious fire in his recollection was in 1866, at their Pendleton Colliery, and in that case he thought it originated from one of the men setting brattice on fire and leaving it, and, unfortunately, some lives were lost. The greatest difficulty was in getting the water to the fire and applying it, and in the meantime arrangements were made, in the event of their being unable to master the fire, to flood the mine. They then employed a small fire engine to get the water to the place, and he thought that at every colliery it might be advisable to have a small fire engine fitted in a wagon ready to take to any place, and to have hose of sufficient length to enable them to get a jet of water on the fire immediately. This would be preferable to the old plan with buckets, for, by the method he suggested, the men could stand some distance from the fire, which, by the creation of steam and smoke, did not get on so rapidly. He had found that a fire went backwards towards the intake more than with the return, because the amount of smoke which was created destroyed the atmosphere which was required to feed the fire.

Mr. FLETCHER said his experience had been the same as that of Mr. KNOWLES, and he had noticed how a fire traveled backwards towards the fresh air. They had attempted for a week to put a fire out with water, and no doubt they would have succeeded had it not been for the falls of roof which occurred, thus liberating gas, which rendered it impossible to continue applying water. They had, therefore, to have recourse to the usual expedient, and put up stoppings. They had recently opened the pit after it had been closed some months, and they found that, if they had been able to go on applying water, they would have been able to extinguish the fire, as it had not really got very much hold.

Mr. THOMPSON said he could not bear out what had been said in regard to the fires working backwards, but in this case the men were almost driven into the pit shaft.

Mr. DICKINSON (inspector of mines) said Mr. THOMPSON had given the particulars so fully with regard to the fire that he could scarcely add anything. He had not, however, made it quite clear that the mine when shut up was filled with fire-damp, and the danger of sending a current of air through this was lest they might create an explosive mixture.

Mr. MARTIN, referring to a fire at a pit with which he was connected, said he had found the fire extend into the roof more than into the coal. He had found water to be very effectual in putting out fires.

Mr. WOODWARD, referring to a fire with which he had to deal, said that after the pit had been shut up for six months, they had found it still burning, and they had even then to drown it out with water.

Mr. TONGE said that they had been amongst those unfortunate ones who had had underground fires. In their case they had a quantity of hose, and were playing on the fire, which was being well mastered, when, unfortunately, the smoke got between the men and the shaft, and they were compelled to come out. Having failed in that, they turned a large quantity of water into the shaft; in a few days they opened it again, and the fire was out. He should like to know if there was any particular reason for air being dammed out instead of water being pumped in, and whether water was not the best remedy.

Mr. PACKINGTON said that in a case of theirs they would have been compelled to flood nearly half the mine before they could have got the water to the fire, and that was a good reason for damming off the air. The great thing was to get to the fire as soon as possible, but the smoke and gas were the great difficulties in preventing the men getting at the fire.

Mr. THOMPSON said the difficulty in their case was that they had fire on each side of them for 20 yards, and fire in front of them, and they could not get the water to the front of the flames.

Mr. TRAICE thought there was a danger of confounding combustion with heat. It had often occurred to him, when air was allowed to re-enter a mine, that it was possible the heat might still have been so great that the process of combustion might recommence.

Mr. THOMPSON, referring to what Mr. TRAICE had said, observed that when they re-opened the pit it was full of fire-damp, and it was not possible for combustion to go on in that mixture.—*English Exchange.*

MANUFACTURE OF BESSEMER IRON AND STEEL IN BELGIUM, SWEDEN, Etc.

Special Report of the Conversazione of the Institute of Mining Engineers.

OWING to the fatigue and excitement of the Opening Day, and the number of dinners and receptions which were given the next evening (the 11th inst.), the meeting at the rooms of the American Institute of Mining Engineers on Thursday night, the 11th, was not so largely attended as the one of the week before, there being about twenty-five present. Among these were Prof. A. R. C. SELWYN, Director of the Canada Geological Survey, Mr. JULIEN DEBY, Special Commissioner from Belgium; A. BRUSEWITZ, of the Fargersta Steel Works in Sweden; GUST. UHR, CARL DANIELSSON, and IVAN HALLSTROM, of the Swedish Commission; Mr. A. L. HOLLEY, Gen. WILDER, of Tennessee; J. BLODGETT BRITTON, of Philadelphia; Prof. E. J. COX, of Indiana; WILLIAM P. SHINN, of EDGAR THOMPSON Steel Works; JOHN BOGART, Engineer of Parks, New York City; and JOHN L. GILL, Jr., of Pittsburg.

It was announced that an invitation had been extended by Prof. P. FRAZER, who was present, on behalf of the Commissioners of the Pennsylvania Geological Survey, to attend that evening a reception at the Penn Club. Mr. HOLLEY then spoke of the Exhibition just opened, saying that however diversified seemed the display of exhibits, engineering science might almost be considered as having formed their superstructure.

Mr. J. DEBY, whose papers on Bessemer Steel Manufacture in Belgium, read before the Iron and Steel Institute of England, are so well known, gave some account of the works at Seraing. He said that the effort which had been made to equal the rail production of our American Steel Works, had not yet been successful, which fact he attributed largely to the lack of certain of our mechanical appliances, one of the most important of which is the three high blooming mill.

The yield of the raw steel in the Bessemer converters has been much increased within the last year, so that now nearly as much product is obtained per week as in the American plant of the same size. The iron used for making the steel is produced in furnaces immediately adjoining the converters. It is run from the furnaces into car ladles, which, by track and hydraulic lift arrangements, similar to those in use at the Bethlehem Works, run the iron directly into the converters. Mr. DEBY described the very simple arrangement which is used for weighing the ladle and contents. After the hydraulic lift has brought the ladle car to the level of the converter platform, communication with the accumulation is shut off, and then a gauge shows the pressure exerted on the water in the cylinder by the plunger and its load. A few trials show how much these without the fluid iron exert, and after the proper allowance is made for friction of the plunger, the weight of metal put into the converters can be very closely controlled. Mr. DEBY stated that the ores, coke, and limestone used in the furnaces were so constant in chemical qualities that the percentage of silicon does not vary enough to make analysis necessary. The ores used are mostly Carthagenian, and from the north of Spain, and contain enough oxide of manganese to produce 3½ per cent. of that metal in the iron smelted. These ores cost at the furnaces about nine dollars per ton, gold, and average 53 per cent. of iron. As the steel rails finally produced from these ores are now selling in the market for about forty-five dollars, gold, a ton, the other materials used, and labor employed, must be obtained at extraordinarily low figures to make the business profitable. Mr. DEBY stated that, owing to the percentage of manganese contained in the iron, the American and English system of "blowing" the fluid metal to decarburization and then adding spiegel, was not practiced at the Cockerill Works. The iron is only blown until it has enough carbon remaining to leave a metal of the requisite hardness. For determining this point, use is made of the spectroscope, and also a slag color-test is resorted to. During the early period of the blow the slag has a light color which deepens in intensity as the operation is continued.

Experiment has shown that the different tints correspond closely with the percentages of carbon, so that by means of a scale of comparison the time for stopping the blast is clearly shown. The small globules of metal which adhere to the flat paddle, introduced into the converter to get slag samples, also show by their hardness the condition which the steel is in.

Mr. HOLLEY asked whether the spectroscope could be used successfully where steels containing high percentages of carbon were made, saying that in this country, when tried, the strong white flame at the corresponding period of the blow had been thought to make the determination impossible.

Mr. DEBY replied that up to 0·75 per cent. of carbon he thought the spectroscope gave reliable results. Mr. HOLLEY also asked whether in making these high grade steels more silicon was not left in the metal than was desirable, and also the amount of manganese remaining in the metal.

In reply Mr. DEBY said that enough of the silicon was removed to leave the steel good, and that the rail ingots contained about one-half per cent. of manganese. Mr. EMIL BRUSEWITZ did not understand how the slag color-test could be used in determining the amount of carbon in soft steels, for he said that in making the Bessemer metal from Swedish irons they always found the slag to become blue-black before the operation terminated. Mr. DEBY suggested that they perhaps made a softer product, or the different nature of the iron might account for it. It was claimed, however, that the finished railroad tires contained from ·50 to ·60 per cent. of carbon, which certainly seems very high. Mr. DEBY mentioned the fact that the cinder made at the Cockerhill furnaces air-slacked a few hours after being run out. This is probably owing to its being composed of little except highly basic silicate of lime, like many of the cruders made in the English West Cumberland furnaces, which have this composition and act in the same way.

Mr. BRUSEWITZ was asked how the titaniferous ores of Sweden were treated in the blast furnaces to obtain Bessemer pig. He said that in the Central Swedish iron district where most of the Bessemer pig was made the ores were not titaniferous, but that when such were smelted, limestone was the only flux employed. Much more fuel than was used with ordinary ores was, however, necessary. Gen. WILDER said that last Fall he visited the furnaces of the Norwegian Iron Company, near Stockton, England, where they have been experimenting on titaniferous ores from the first-mentioned country. These ores, when used as a mixture in ordinarily fluxed charges, had proved exceedingly refractory, often coming out unreduced and unfused with the cinder. They have, however, discovered that by using common red brickbats for flux the ore works easily in the furnaces, and the iron produced is extraordinarily tough. At the John Brown Works at Sheffield when similar ores are used containing over twenty-five per cent. of titanic acid, brickbats are used with equally good results. The alumina contained in the brick clay must play an important part in the fluxing of the titanium, as but very little of it goes into the iron. Gen. WILDER then showed some specimens of magnetic ores from Tennessee, which contain almost no phosphorus and sulphur, but which are highly titaniferous. This concluded the session of the evening, after which most of those present adjourned to the reception at the Penn Club. N.

THE SPATHIC IRON ORES OF THE HUDSON RIVER.*

By R. W. Raymond.

I DESIRE to call the attention of the Institute briefly, and by no means in the way of an exhaustive description, to the interesting developments recently made on the east bank of the Hudson River, in the mining of spathic iron ores. The mines to which I refer are those of the Hudson River Spathic Iron Ore Co., situated at Oakhill-on-Hudson, Columbia County, N. Y., five or six miles from the city of Hudson, and opposite the town of Catskill. The ore occurs in beds, constituting apparently members of the stratified series of rocks on that side of the river, coursing nearly north and south, parallel with the river, and dipping east. The principal outcrops are presented in a range of low hills, about one mile from the river, along the crest, or in the western face of which the stratum of spathic ore is more or less exposed. The length of the line in this range, along which, at various openings the ore has been discovered in profitable quantity, is about two miles. To the northward, the hills are somewhat higher, and the stratification may possibly be disturbed—though the rapid examination of the locality which I made in November last did not include any determination of this point, and the suggestion is merely a conjecture, supported to some extent by the contours of the surface, and by the circumstance, reported to me, that the continuation of the bed had never been traced in that direction. To the southward, on the other hand, the surface is lower, and it appears likely, from various explorations, that the ore-bed is either less tilted, and is buried under other formations, or that its continuation is more silicious and calcareous, so that it is not workable as an iron ore. The thickness of the bed, as exposed in the workings of the company, is perhaps ten or twelve feet. At one point I observed a thickness of sixteen feet. About a mile and a half further east, another outcrop has been discovered, probably indicating a parallel bed, or the same bed, brought again to the surface. But the ore is reported to be poor and unfavorably located for mining. It is the range first described, lying back of the old LIVINGSTON manor-house, and largely on the LIVINGSTON estate, which is actively worked by the Hudson River Company, 15,000 tons having been shipped during the navigation-season of 1875, and a capacity for much larger shipments during the present year having been developed, if the demand for iron ores shall warrant their extraction. The works are altogether open quarries, and extraction is, and for a long time will be, exceedingly cheap. The ore can be mined and hauled to the dock at the river, I should think for less than $1.50 per ton. It is delivered to purchasers at the dock for $2.00. I understand that this price is to be reduced for the coming season.

In appearance, the ore resembles a fine-grained dark gray silicious limestone, except where by weathering it has become peroxidized, assuming a dark red color. Fragments along the outcrop frequently present the appearance of brown hematite on the outside, while the center is unaltered. Red Hill, the most northerly locality opened upon the range, derives its name from the dark red color imparted to rocks and soil by the weathering of the edge of the spathic ore-bed. It is strange that so marked an indication of the pressure of iron should have passed unnoticed for so many years. Even the state geologists do not seem to have noted the occurrence of the carbonate of iron in this locality. The rocks underlying it are slates, and I believe the overlying formation is calcareous also—a shale or limestone. It may be that the bed-bottom is only in certain places sufficiently ferruginous to be called an iron ore, and that, taking sections across the series at other points, they found no special zone of spathic iron in the general succession of calcareous strata. Since calcic and ferrous oxide are interchangeable in the carbonates, such a variation would not be unusual.

The Livingston and Miller Mines are the two other principal openings. Here the ore is less altered, and grayer in appearance. In all three places, considerable sorting must be practised, to obtain a uniform maximum richness of the ore. It seems to vary in quality—principally in its contents of silica and lime—within short distances, or in different zones of the bed, parallel with the walls. The weight of the pieces affords the readiest test of their value as ore.

The quality of the ore may be inferred from the following analyses and reports of blast-furnace managers:

ANALYSES OF HUDSON RIVER SPATHIC IRON ORE.

	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
Peroxide of Iron }	62·98	43·90	61·50	52·62	42·37	67·36		43·44
Protoxide of Iron }							40·13	15·80
Sesqui oxide of Manganese						1·80		
Protoxide of Manganese }	3·31	3·49	4·89	1·44 }			0·73	1·07
Alumina }				2·13 }	6·93a	2·50	2·28	2·46
Lime }	1·00	1·75	2·45	1·33 }		·85	1·27	1·43
Magnesia }				2·01 }		1·02	3 81	2·86
Silicious matter	21·05	22·25	31·15	14·77	21 28	14·68	23·02	14·00
Carbonic acid	11.25	27·82		21·94	24·27		27·30	14·24
Phosphoric acid	Very light trace.			0·43	0.67	0·48	0·38	0·41
Sulphuric acid	Rather heavy trace.			0·47b		0·11b	0·22	0·34b
Bisulphide of iron					4·48		1·41	
Water				2·16		11·91		4·49
	99·59	99 21	99·99	99·90	100·00	100·71	100·55	100·54
Metallic Iron	45·52?	34·14?	47·29?	38·80	34·26	47·15	31·87	42·54
Phosphorus				0 19	0·29	0·210	0·167	0·184
Sulphur				0.47	2·39	0·11	0·84	0·34

a And water. b Sulphur.

I. Red ore, Analyst, Chemist of Lackawanna Coal and Iron Co.
II. Gray ore, " " " "
III. Gray ore, roasted " " " "
IV. Gray ore, J. B. BRITTON.
V. Surface ore, C. F CHANDLER.
VI. "Brown hematite" (Surface ore?), } Analyses furnished by the Co. Chemist's name not given to me.
VII. "Carbonate" Gray ore?), }
VIII. "Carb. and hem." (Weathered ore?), }

REMARKS.—The amount of metallic iron in I., II., and III. I have obtained by calculation, assuming the iron to be wholly protoxide in II., while of the 62 98 per cent. of oxide of iron reported in I., I have assumed that 18·41 per cent. is protoxide, to satisfy the carbonic acid present, and the remainder per

*A paper read before the American Institute of Mining Engineers, at the Washington Meeting, February, 1876.

oxide. To these analyses may be added three determinations by Mr. BRITTON of the metallic iron in samples of gray, red, and mixed gray and red ore roasted, giving 36·34 per cent., 49·55 per cent., and 53·39 per cent., respectively.

It appears from these analyses, that the ore, in its undecomposed state, is an impure spathic iron, containing about 35 per cent. of metallic iron, 14 to 23 per cent. of silicious matter, 7 per cent. of earths and manganese, and say 0·40 per cent. of phosphoric acid. The amount of sulphur is variable, depending apparently on the amount of disseminated pyrites. Prof. CHANDLER'S analysis shows in one case 2·39 per cent. of sulphur from this source—an amount which I imagine to be considerably above the average. The quantity of phosporus in the ore is not too large to permit its successful use for foundry and mill irons, but it would exclude it from the manufacture of Bessemer iron. Roasting of course expels the carbonic acid and (from weathered ore) the water, and thus increases the percentage of iron in the ore, as the analyses show.

The yield of iron in the furnace, is variously given. According to one founder with whom I conversed, it is not more than 30 per cent. of the weight of the unroasted ore. Mr. WRIGHT, President of the Peekskill Iron Co., estimates it at 35 per cent., and Mr. WILLIAM ATKINS, Superintendent of the furnaces of ATKINS BROTHERS, at Pottsville, Pa., says that having used during the last season about 4,500 tons of the spathic ore, he found it to yield about 38 per cent. For the variation of estimated yied there are two reasons. In the first place, the ore is not used alone, but smelted with other ores. At Peekskill, 35 per cent. of it was used, I suppose with the well-known "Croft" magnetic ore. At Pottsville, from ¼ to ⅓ the ore charged was spathic ore, the remainder being usually Cornwall ore, or New Jersey or Port Henry magnetite. The yield of the spathic ore by itself is therefore largely a matter of surmise. In the second place, the mines were worked last season by a contractor, who found it profitable to ship as many tons as possible, and was not interested in a rigid sorting of the ore. From some of the openings a good deal of my lean material was sent away.

According to the testimony of the two consumers I have named, the behavior of this ore in the furnace is in the highest degree satisfactory. It melts easily and gives a very fluid cinder, for which reasons it is strongly recommended as an addition to refractory magnetites. According to Mr. WRIGHT, the use of 35 per cent. of it effected a decrease of about 7 per cent. in the limestone required, and a reduction in the amount of fuel consumed. According to Mr. ATKINS, it made "a good hot cinder," and caused the magnetic ore worked with it to melt more easily. He reports that by using the spathic ore he can carry from 10 to 15 per cent. more burden, and that it requires about 15 per cent. less lime than "ordinary hematite." I believe that both at Peekskill and at Pottsville the ore was charged without previous roasting.

The development of this deposit is worthy of special attention because it suggests forcibly the possibility of similar discoveries, elsewhere in the older rock-formations, of carbonates of iron which have hitherto been overlooked, both by the geologist and by the exploring miner. The gradual exhaustion of our surface brown hematites in many localities renders the discovery of easily-smelting ores to take their place more important than will be for a long time to come the opening of new sources of supply of hard and refractory magnetites.

MINING NOTES FROM MONTANA, UTAH, COLORADO, IDAHO, AND MICHIGAN.

MONTANA. From the *Independent* we take the following: "*The Lexington Lode* four miles north-west of Helena. A specimen of quartz recently taken from this assayed at the rate of twenty-four thousand dollars to the ton. The main body of ore is fourteen inches in thickness, and is composed of chloride of silver, copper, and silver glance. It is four feet wide between the wall-rocks, and it is believed will average throughout $8,000 to the ton. The rock is literally interlaced with silver wire as thick and large as tenpenny nails. The peculiarity of the vein and the character of the rock has won for it the epithet of shoe-peg silver; and indeed the wire sticks out from the body of the rock in sharp, penetrating points like a row of shoe-pegs.

This quartz is taken out at a depth of thirty feet, and as the chimney on which they are now at work develops, the ore increases in value. It has every indication of permanency."

Snow Shoe Gulch Mines.—Fifty ounces of gold dust is the result of the work on this claim last winter. Mining is being actively prosecuted, and present prospects indicate a successful season. This is the first reported instance of ground-sluicing all Winter in the mines of this Territory.

Pork Mines.—A $6,000 gold brick is the result of a recent run from 240 tons of quartz from this mine, being an average of $25 per ton.

Thompson's Gulch.—Two new claims have been opened here, with fine prospects ahead.

The Hellgate and Avalanche Ditch Company, in Meagher County, are building a flume through Cave Gulch, 2,000 feet in length.

The Cliff Mine, in Wisconsin Gulch, is turning out quartz worth $42 per ton..... A company has been formed to run an open cut and bed-rock flume in the Wisconsin Creek Mines....A new ditch is to be opened to the Nevada Creek Mines....The Baercroft claim on Indian Creek is turning out fine pay ore....The Spruce Bar and Magpie Mines are doing splendidly.....The Olds & Thomas mill, on the Red Bluff Lode, Madison County, is crushing splendid ore and running on full time ...A four-foot vein of copper ore has been found in the Crazy Mountains....The new copper lead near Bannack is to be opened in a few days....The Broad-gauge Mine at Brandon is turning out excellent quartz .. The Mallory Mill in Madison County will start up this week on quartz from the Strawberry District .. The Pilgrim Lode, in Madison County, has turned out three silver bricks, worth $1,000.

UTAH.—From the Salt Lake *Tribune* we take the following, with reference to the Dry Canyon mines:

The Queen of the Hill is fully justifying the name, and is opening into larger ore bodies daily, shipping sixty tons per day.

The Hidden Treasure's new hoisting works were to have been completed by May 15th, when they would work 100 men, and ship from 75 to 100 tons of ore per day.

The Shoo Fly and Deseret Mine shipped about thirty tons of rich ore recently. From present appearances it will soon double the amount of its weekly shipments. Some very fine specimens of native silver have recently been taken from this mine.

The Silver Crown Company have struck into a fine vein of galena ore, a little over two feet in thickness. Regular weekly shipments of ore will be begun as soon as the snow will permit getting building materials to the mine for a boarding house, shop, etc., to accommodate a force.

The Emporia Mine recently shipped upwards of 1,200 sacks of choice ore.

The Fourth of July has shipped sixty-five tons of assorted ore. The mine is improving and looking well.

The Magnolia Mine has a well-defined vein holding small pockets of rich ore, and is now about 300 feet in depth.

The McCall Mine makes regular shipments of twenty-five tons of ore per week.

The Belfast Mine recently made its first shipment of about five tons of ore. This mine shows some small pockets of very rich ore, encased in the regular ore vein, which shows continuous and regular, to average two feet in width, from the surface to the bottom of the incline, at a depth of 400 feet.

The following mines are at work, and show marked improvement: Galena, Pine Grove, AcBar, Dom Pedro, Wandering Jew, Home Stake, Keystone, Joy, Mahogany, and Leap Year.

Those preparing to start work are the Ontario, Bell Wilfur, May Flower, Seventy-five, and Rib Tickler. Taking this camp throughout, there never has been any time when its mines and prospects gave their owners more solid encouragement than at the present time.

COLORADO.—*The Corning Tunnel Company.*—From the Boulder, Colorado, *News* of the 5th instant, we take the following:—This tunnel is being driven through Gold Hill, and it is designed to channel the entire distance, which is a little more than a mile. The veins, so far, cut by the tunnel yield free gold ore, soft iron, and copper pyrites. The process of treatment adopted is as follows--The harder rock will first be broken by a jaw crusher, thence fed into the batteries of the common stamp mill, using the common amalgamating tables, only that the copper plates for this mill have a coating of silver, regarded as an improvement. What gold escapes amalgamation in passing over these galvanized plates, goes off with the tailings, and these are to be concentrated, and the concentrate sold, or eventually worked on the ground as may be judged most profitable. There is a market for it here, at the Boyd Smelting Works, where it is wanted for a flux, or for the proper mixture of ores. It is an article found indispensable in the successful smelting of Colorado ores. The working of the free gold ores by the common stamp mills and the consequent production of abundance of iron pyrites, is laying the foundation for extensive smelting works in this county. The Bonanza is the name given the vein last caught by the Tunnel, 600 feet in. This vein of ore is being developed for supplying the mill, or, rather, the mill is erected to make available the ore brought to sight in this mine. The Bonanza vein is cut at a depth of about 400 feet from the surface of the ground. Eastward on the Bonanza the drift extends 200 feet, disclosing a continuous pay, varying very little from an even width, the average thickness of the vein of mill ore being about three feet; or, to be more exact, the variation is from two feet four inches to three feet six inches. West the Bonanza drift is run 140 feet, in which there is 25 feet of barren ground—the remainder being much the same as east, with pay in the breast of the level. Assays from various portions on this vein gave the following results:—$38.75, $86.46, $24.52, $177.88, $12.53, $81.57, $32.62, $49.43. $29 32. The average is $59.32 per ton, about $50 in gold, and the balance silver. It is reasonable to believe that 50 per cent. of the gold will be saved on the tables of the mill; but if 30 per cent. is saved—the rest left in the tailings—the company can make money fast enough.

IDAHO.—(From the Silver City, Idaho, *Avalanche.*)—*The Bell Peck.*—This gold mine, in Owyhee County, is reported as doing well. The last crushing of rock, at the Shoenbar mill yielded $33,477.90. This came from twenty-four days' crushing. The average run of the mill, which has two arrastras, three pans and two settlers, is about five tons of rock per day. This finishes up the crushing of company rock, the mine having passed into undivided ownership. As soon as the tunnel is carried in about one hundred feet further, and the flow of water consequent upon the melting of the snow is reduced, a large force of men will be put to work, and further developments are promised.

MICHIGAN.—We take the following from the Marquette *Mining Journal*: The *Lake Angeline Iron Mine* is situated on the south side of Lake Angeline, on the line of the Marquette, Houghton & Ontonagon Railroad, about seventeen miles west of Marquette. The company owns 1,376 acres of land. The mine has four openings on a stretch of deposit 1,700 feet in length. Along the base of a vertical bluff of crystalline trap, 200 feet in height, is the ore deposit. Along the front of the deposit, near the surface, there was a strip of mixed ore and jasper, but this was worked out, giving place to a much better and more uniform quality of ore. On the south side of the bluff is the brown hematite mine, which is an opening 40x150 feet, and which yields as fine a quality of hematite as can be found in the region. The pit is supplied with pumping and hoisting machinery, and is most favorably situated for profitable mining. The product of the Lake Angeline has been as follows:

	Gross tons.		Gross tons.		Gross tons.
1864	19,500	1869	35,432	1874	31,526
1865	20,151	1870	53,467	1875	26,370
1866	24,073	1871	33,645		
1867	46,607	1872	35,221	Total	397,576
1868	27,651	1873	43,933		

The company employs regularly about sixty men; it recently started shipping ore from a 24,000 ton stock pile. This is the largest amount of ore that this company has ever had on the banks at the opening of navigation. The stock piles consist of 18,000 tons of hard ore and 6,000 tons of hematite.

Superior Mine.—The *Iron Home* gives 11,000 tons as the product of this mine for the month of April.

The Deer Lake Iron Company have about 16,000 tons of pig iron at the railroad docks in Ishpenning awaiting shipment. Almost all of it has been sold and will be shipped as soon as boats arrive in Marquette and Escanaba.

From the Portage Lake *Mining Gazette*, of May 12, 1876, we take the following:

"The tug *Bob Anderson*, which left Houghton, Mich., last Monday for Isle Royale, arrived at the Island mine that evening, and found that the stamp mill erected by the tributers last fall had been burned down in March. The men had got out but little copper up to the time of the accident, so that their case is a hard one. At MCCARGOE'S Cove, matters at the Minong were progressing favorably. While the developments at the mine during the winter have not been startling, still they are of a character to give the company great hope, and warrant the erection of a stamp mill which will be commenced at an early day. Two men who volunteered during the winter to carry a mail from the Island or the Minong mine to the main-land, across the ice, were lost. The general health of the two settlements—Island and Minong—during the winter, has been good.

"The Island mine tributers, in the face of many difficulties, went to work after losing their mill and commenced the erection of another, which is now partially framed, and will be fitted with the necessary machinery as soon as possible.

"The *Anderson* called at Silver Islet, and found things quite active, so far as work about that mine is concerned. No particular change is reported in the way of mineral underground."

DIVIDENDS AND ASSESSMENTS OF COPPER MINING COMPANIES.—We take the following from the *Portage Lake Mining Gazette*, of the ten Lake Superior mining stocks which have paid dividends, and also the amount of assessments levied on the same:

	Assessed.		Dividends Paid.	
	Per share.	Total.	Per share.	Total.
Central	$5 00	$100,000	$51 00	$1,020,000
Copper Falls	25 00	500,000	5 00*	100,000
Calumet	15 00	.....	15 00	300,000
Hecla	25 00	.....	32 50	1,500,000
Cal. & Hec	15 00a	1,200,000	116 25b	9,310,000
Franklin	16 00	320,000	14 00	280,000
Minnesota	21 80	436,000	91 00	1,820,000
National	7 50	150,000	16 00	320,000
Pewabic	9 25	185,000	23 00	460,000
Pittsburg (Cliff)	5 55	111,000	124 00d	2,480,000
Quincy	10 00	200,000	99 50	1,990,000
Ridge	20 00	400,000	4 50	90,000
		$3,602,000		$18,810,000

* $3 June 1, 1864; $1 Feb. 10, 1871; $1 Aug. 21, 1871.
a 80,000 shares; all others 20,000.
b The average on 80,000 shares, including May 15, 1876.
c $10,250,000, grand total.
d $10 per share "in liquidation" included.

The total assessments paid by all the different companies, good and bad, amounts to about $21,500,000, so that nearly this sum has been returned in dividends alone, to say nothing of the fifteen millions representing the market values of the paying stocks.

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending May 13.

Tons of 2,240 lb.	1876. Week.	1876. Year.*	1875. Week.	1875. Year.*
Wyoming Region.				
D. and H. Canal Co	48,597	69,030	71,705	1,044,892
D. L. and W. RR. Co.	27,310	447,527	73,640	975,742
Penn. Coal Co	19,918	324,488	29,379	417,877
L. V. RR. Co.	9,873	315,277	14,946	326,779
P. and N. Y. RR. Co.	—	9,082	4,168	30,301
C. RR. of N. J.	36,399	385,070	16,313	127,670
Penn. Canal	9,509	41,061	363	303
	147,606	2,216,535	210,514	2,923,624
Lehigh Region.				
L. V. RR. Co	16,870	681,512	6,897	142,055
C. RR. of N. J.	32,311	345,815	75	5,515
D. H. and W. B. RR.	206	12,798	1,560	15,865
	49,387	1,040,125	8,532	163,435
Schuylkill Region.				
P. and R. R. RR. Co.	103,469	1,239,537	36,869	401,054
Shamokin & Lykens Val.	18,930	273,414	23,714	328,465
	122,399	1,512,951	60,583	729,519
Sullivan Region.				
Sul. and Erie RR. Co.	1,816	20,696	—	5,419
Total	321,208	4,790,307	279,629	3,821,997
Increase	41,579	968,310	—	—
Decrease	—	—	—	—

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about seven per cent. of the whole production.

The receipts at Port Richmond for the week were 45,000 tons, shipments 29,000 tons, and balance on hand 183,500 tons.

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Piedmont Railroads amounts to 156,633 tons, as compared with the corresponding period in 1875.

Perth Amboy business:

	Tons.
Received for the week	1,562
Shipped for the week	9,698
On hand May 13	97,350

Freights to Boston, 1.10; New Haven, 65c.; Bridgeport, 65c.

The Exports of Coal from Baltimore for the week were .... tons, and since Jan. 1st, 10,860 tons, as against 16,354 tons for the corresponding period of 1875.

Receipts of Coal at Boston, for week ending May 12, and years from September 1st, 1874 and 1875.

From	Week. Tons.	Previously. 1876. Tons.	1875. Tons.
Alexandria and Georgetown	1,772	58,848	50,474
Philadelphia	19,541	429,535	300,780
Baltimore	1,828	88,898	107,995
Other places	5,338	201,159	135,777
Great Britain	—	4,111	2,124
Nova Scotia	—	12,851	15 170

Belvidere Delaware RR, report.

	Week.	Year 1876.	Year 1875.
Receipts of coal at Coal Port (Trenton)	760	52,137	206
" " " South Amboy	2,513	168,871	18,564
Shipments at Coal Port (Trenton)	4,192	51,346	196
" South Amboy	8,403	143,783	96,713

Shipments of Coal from Richmond, from January 1, 1876, to May 13, 1876, inclusive:

	Week.	Year.
By Cannellton Coal Company	1,148	8,962
" Peyton " "	330	4,809
" Blacksburg " "	325	3,510
" Coal Valley " "	375	3,433
" Other " "	160	3,635
Total tons	2,338	14,349

Coal Shipped at Pictou, N. S., for week ending May 13, 1876 ..... 3,535 tons.
Previously exported ..... 3,633 "
Total to date 7,168

The Production of Bituminous Coal for the week ending May 13, was as follows:

Tons of 2,000 lb., except where otherwise designated.

Cumberland Region, Md.	Week, Tons.	Year, Tons.
Tons of 2,240 lb.	44,497	476,200
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb	4,326	122,949
Broad Top Region, Pa.		
Huntingdon and Broad Top RR	3,393	59,244
*East Broad Top	393	25 044
Clearfield Region, Pa.		
*Snow Shoe	121	19,159
*Tyrone and Clearfield	4,167	361,879
Allegheny Region, Pa.		
*Pennsylvania RR	679	70,227
Pittsburgh Region, Pa.		
*West Penn. RR	553	73,372
*Southwest Penn. RR	117	18,648
*Penn. & Westmoreland gas coal, Pa. RR.	3,168	232,498
*Pennsylvania RR.	1,155	104,790

* For two days ending April 30.

The Production of Coke for two days ending April 30.

Tons of 2000 lb.	Week. Tons.	Year. Tons.
Tyrone and Clearfield	..	..
Alleghany Region	..	..
West Penn. RR	103	16,006
Southwest Penn. RR	1,888	154,522
Penn. & Westmoreland Region, Penn. RR.	274	11,563
Pittsburgh, Penn. RR	..	69,395
Total	2,265	251,486

COAL TRADE REVIEW.

NEW YORK, Friday Evening, May 19, 1876.

Anthracite.

THERE appears to be even less business doing to-day than a week ago, and prices are only nominal. The Lehigh Valley R.R. Company has consented, in a way, to act in harmony with the Combination—although it has not fairly entered the charmed circle, yet the confidence of that incredulous class, the buyers of coal, in the permanency of the Combination, is still far from unlimited. They are withholding their orders partly in anticipation of lower prices, and partly because of a disinclination to carry heavier stocks than are absolutely required. Heretofore it has been the policy of the Combination to advance prices from the opening of the season, reaching the maximum in November and nominally continuing it until the opening of the following season, although practically a large amount of coal has usually been offered during the Winter months, at as low a figure as at any time during the year. With this record before them it is not strange that many buyers are holding back their orders. Years ago, when a large proportion of the coal was brought to market by canal, it was necessary that stocks should be laid in early; but now, it is as easily procured, at most points, during the Winter months as in the Summer, and as there is but little if any, difference in the cost of mining and preparing coal in the Winter and Summer, we see no reason why buyers should supply their necessities months in advance. It being conceded that there is no reason to anticipate a stoppage of production by a strike.

The secret of a revival of the coal trade, as well as of many other branches of business, appears to lie in large concessions in the price of coal and transportation to our iron and other manufacturing industries, that they may be able to enter the markets of the world in competition with other countries. When this shall be done there will be no necessity of breaking, as is now being done, nearly the whole product of the mines into domestic sizes, incurring, thereby, a large waste and additional expense.

Bituminous.

There is a rumor of a contract having been made for 15,000 tons of Clearfield coal, but we are unable to learn the particulars. This coal continues to be produced very actively, although there are not many important orders being placed at the present time. The Cumberland region shows quite a falling off in production for last week, as compared with the corresponding week of 1875. It is so crippled with high rates of wages and freights that its prospects are very discouraging. The position at the mines is unchanged. The movement to reduce wages appears to be a failure, for the present, at least, but the results of high wages and high freights are likely to finally necessitate such sweeping concessions in each as will enable this region to regain its lost ground. It is quite evident that it is only a matter of time when this coal will be delivered, f. o. b., Georgetown, at a cost of $2.50@$2.75 per ton, which will place it in a position to do a large export business, even though anthracite coal should become much lower than we have seen it for years.

The American Coal Company, and, we understand at least one other company have instituted proceedings to secure writs of injunction against the Cumberland and Pennsylvania Railroad Company, and the Consolidation Coal Company, to prevent them charging three cents per ton per mile on distances over ten miles, and five cents per ton per mile for distances of five miles or less.

Mr. CAMPBELL, the President of the Consolidation Coal Company, was interviewed by a *Herald* reporter and authorized statements which he has since had to correct. Mr. CAMPBELL'S statement in the *Herald* were answered in the *Evening Post* of the 16th inst., by a correspondent signing himself "Maryland," who appears to have a very thorough knowledge of the facts relating to this case. This drew out a reply in the *Evening Post* of the 17th inst. from Mr. CAMPBELL, in which he attributes the attack upon his company "to large oversales of stock."

We regret that our limited space does not permit us to publish these letters in full, that our readers might have a full understanding of the position. We cannot, from our independent and disinterested stand-point at at all agree with Mr. CAMPBELL, in his theory of the opposition shown to the Consolidation Coal Company, and we think he greatly underestimates its force and ultimate results. It will not surprise us to see the charter of this company vacated, or rather declared invalid, and we can find no ground for the present price of the stock. It is very evident that even if the company should maintain its existence, there is under the policy it is pursuing, not the least probability of its earning any dividend this year, and there is a fair prospect of results much more unfavorable than even this.

CIRCULAR TO SHIPPERS OF SALT AND COAL ON THE KANAWHA.

At a meeting of the Kanawha Board, held April 18th, 1876, the following minute was made:

"The Board being convinced that both the Coal and Salt interests of the Kanawha Valley are at present suffering from the general financial stringency prevailing throughout the country, and also from the close foreign competition with which they have to contend, and deeming it their duty to sustain and foster these industries as far as this end can be accomplished, by such a reduction in the tolls on these commodities as will not cripple their ability to proceed with and maintain the improvement of the river, adopted the following resolutions:

"*Resolved*, That instead of the present discount of ten per cent. from present rates, heretofore allowed to coal shippers for prompt payment of tolls, there be allowed, until otherwise ordered by this Board, a discount of fifty per cent. from the tolls on all coal shipped on the Kanawha River, on and after the first day of May, 1876, to all persons who shall pay promptly, quarterly, all tolls on coal for which they may be liable. The said discount of fifty per cent. is to be for prompt payment of said tolls; and no person shall be entitled to said discount who shall fail to pay his tolls within twenty days after the end of each quarter.

"*Resolved*, That until it be otherwise ordered by this Board, the present rates of toll on salt shall be reduced forty per cent."

W. F. GOSHORN, President.
J. D. BAINES, Secretary,

Coal Trade of Philadelphia.

PHILADELPHIA, May 18, 1876.

There is no improvement to report in the trade. The accumulation of big stocks by the companies have scared purchasers, and it looks as if the business would be concentrated in a few months. The dealers at this season of the year should be busy. There is no confidence in the duration of the Combination and, no doubt, the parties to it are much to blame for this feeling, while a proper understanding of the condition of affairs should convince any one that there is no chance at present for a break of the control now imposed on the anthracite coal trade. The parties to the Combination are bound to stand by each other. It is true there is considerable underselling, but past experience shows that this is not a sufficient cause to bring a break.

In the Schuylkill region the supply of cars is shorter than ever before, and many collieries are not even able to make half time.

Freights remain remarkably steady at previous quotations. They are too low for any reduction, and coal is coming too slowly to encourage an advance.

Wholesale Prices of Anthracite Coal for May, f.o.b. at the Tide Water Shipping Ports per ton of 2240 lb.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
‡Lackawanna and Scranton at Hoboken and Weehawken	4 65	4 75	4 85	4 95	5 55	4 85
Pittston at Newburg	4 50	4 60	4 70	4 80	5 40	4 70
Wilkesbarre at Port Johnston	4 65	4 75	4 85	4 95	5 55	4 75
Plymouth, R. A.	....	....	4 85	5 05	5 65	4 85
Susque. Coal Co. at Amboy W.A.	4 65	4 75	4 85	5 05	5 55	4 85
Kingston at Hoboken	4 65	4 75	4 85	5 05	5 55	4 85
Lehigh Coals.						
Old Company at Port Johnston	5 15	....	4 95	4 95	5 55	4 85
Old Company's Room Run "	5 15	....	4 95	4 95	5 55	4 85
Sugar Loaf, Hobok. & Amb. "	5 15	....	4 95	4 95	5 55	4 85
Lehigh Coal Exchange "	5 15	....	4 95	4 95	5 55	4 85
Honey Brook Lehigh	5 15	....	4 95	4 95	5 55	4 85
Beaver Meadow at South Amboy	5 15	....	4 95	4 95	5 55	4 85
Schuylkill Coals at North 9th st., Brooklyn, E. D.†						
Schuylkill white ash	4 65	4 75	4 85	4 95	5 55	4 75
Schuylkill red ash	....	....	....	5 05	5 65	4 75
Shamokin white and red ash	....	....	....	5 10	5 65	4 75
Lorberry	....	....	5 75	5 75	5 75	4 80
Lykens Valley	....	....	6 20	6 20	6 20	5 25

* Contractor's prices are 20c. per ton less.

†The prices of Schuylkill coals for shipment from Philadelphia are 35c. per ton less than at Brooklyn.

‡ Boats towed by the D. & H. C. Co. at its expense to and from New York harbor.

	Per ton.
Freight from Hoboken and Weehawken to New York	40c.
" " Elizabethport & Port Johnston to N. York.	40c.
" " South Amboy to New York	40c.

Freight by the boats of the companies from Hoboken, Port Johnston, Weehawken, Rondout, South Amboy and Perth Amboy to New York City and vicinity 50c

Freight by the Pennsylvania Coal Company's boats from Newburg to New York 65c.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn. at Greenwich, Philadelphia	$4 70	$6 00
" " at S. Amboy	5 50	6 00
Red Bank Cannel Pa. at Philadelphia	8 00	8 50
" " South Amboy	8 50	.
" Orrel	6 00	6 50
Youghiogheny, Waverly Co., at Balt.	4 25	5 75
Despard, West Va.	4 50	6 00

Murphy Run, West Va., at Baltimore..	4 50	6 00
Fairmount, West Va., " " ...	4 35	6 00
Newburgh Orrel, Md. " " ..	4 50	6 00
Cannelton Cannel, W. Va.....	....	10 00
" Splint, " at Richmond.	4 50	6 00
" Gas Coal at Richmond.....	4 00	....
" " " " New York	5 50	....
Peytona Cannel, W. Va. at Richmond...	8 50	10

Manufacturing and Steam Coals.

Cumberland, at Georgetown and Alexandria, Va	3 65@3 75	5 00
Cumberland, at Baltimore ....3 90@4 00		5 25
Clearfield f.o.b. Canton, Baltimore....3 75@4 00		

Rockhill Semi-Bituminous and Broad Top, at the mine, per 2,000 lb., 90, f. o. b. Greenwich, Philadelphia, per 2240 lb., $3 60@3 95, according to destination; at Amboy, 4 60; New York, 5 00.

Clearfield and Allegheny, "Kittanning," "Sterling," "Sonman," and "Eureka," at the mines, per 2000 lb., 90; at Greenwich, Phil., per 2240 lb., 3 75@4 25, according to destination; f.o.b. South Amboy, N. J., 4 75; New York, 5 25.

Foreign Gas Coals.

	Sterling.	Am. cur'cy,
Newcastle, at Newcastle-on-Tyne	9/6@11/	6 50@ 7 00
Liverpool House Orrel, at Liverpool....	26/	13 00
Ince Hall Cannel " ...	42/	18 00
" Gas Cannel " ...	28/	13@14
Scotch Gas Cannel, at Glasgow, nominal,	25/	7 50
	Gold.	
Block House, at Cow Bay, N. S	2 00	5 00
Caledonia, at Port Caledonia....	1 50	4 75
Glace Bay, at Glace Bay.....	1 50	4 75
Lingan, at Lingan Bay.....	1 75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion & Vale mines, at Pictou.	2 25	5 75

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove.	Chestnut.
Pittston coal, in yard.....	$5 70	$6 00	$5 30
Lackawanna coal, in yard.....	5 70	6 00	5 30
Wilkes-Barre, delivered.....	6 25	6 75	6 00
Lehigh & Locust Mountain, del'd..	7 00	7 00	6 00
Schuylkill Red Ash, del'd	7 50	7 50	6 00

The Cost of delivery for Pittston and Lackawanna coal ranges from 40 cts. to $1 10 per ton, according to distance from the yard.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb				....$18 00
Liverpool House Cannel	"	"	"	....22 00
American "	"	"	"	.... 13 00
Kanawha splint,	"	"	"	.... 12 00
American Orrel	"	"	"	.....11@14
Red Bank Cannel	"	"	"	..... 14 00
Cumberland	"	"	"	... 7 00

† This quotation is furnished to us by Messrs. WARD, TALBOT & OLYPHANT.

Baltimore, Md. May 18, 1876.

Reported by our Special Correspondent.

ANTHRACITE.

Wholesale or Trade Prices per 2240 lb.

Wilkes-Barre "Lee" or "Diamond," *Pittston and Plymouth.* White ash.	In cars at depot.	By boats afloat.
Lump and steamboat	$4 62	$4 47
Broken	5 10	4 85
Egg.	5 20	4 95
Stove.....	5 51	5 36
Nut.....	4 66	4 51

Shamokin, (red or white ash), and "Boston," free burning white ash,

Egg.....	5 20	5 00
Stove.....	5 50	5 25

Lykens Valley, red ash,

Egg and stove	6 05	5 68

From wharf or yard, wholesale, 50@75c. additional.

By retail, all kinds and sizes, per 2240 lb. .....$5 25@7 75

BITUMINOUS.

George's Creek, Cumberland f. o. b. at Locust Point. ... .3 90@4 00	
West Virginia Gas f. o. b. at Locust Point 4 50	
Youghiogheny Gas, f. o. b. at Locust Point.....4 50	

Boston. May 13, 1876.

Coal is without business. The market is entertained with a report that cargoes of egg and stove sizes W. A. have been offered at $5.50 alongside wharf. How far this is true it is difficult to learn, but as one or two yard men have taken outside lots, when they have placed memoranda orders with the agents here, and not yet actually ordered coal, it looks very much as though the rumor might be true, and what we have stated concerning the fictitiousness of this order business coming to pass. It seems to be a notorious fact that cargoes of broken are freely offered to foundry men at 25 to 40c. a ton delivered at wharf here under what the combination rates would make them, taking into account even rates of freight 5c. a ton under what we have quoted.

There is no inquiry for either bituminous or gas coals. Freights are dull and unchanged.—*Commercial Bulletin.*

Buffalo, N. Y. May 17, 1676.

Reported by our Special Correspondent.

The Scranton, Wilkesbarre, Plymouth, Shamokin, and Delaware and Hudson (Lackawanna) coals are offered for the present, subject to printed conditions, at the following prices per ton of 2,000 lb :

Deliv'red at	Elmira.	Ithaca.	Syracuse	Rochester.		Oswego
	Afloat.	Afloat.	Afloat.	Afloat	ret. del	f.o.b.
Grate.....	$4 00	$4 30	$4 45	$5 15	$5 60	$5 40
Egg.	4 00	4 30	4 45	5 15	6 00	5 40
Stove.....	4 40	4 75	4 90	5 60	6 45	5 85
Nut	4 15	4 50	4 65	5 35	6 20	5 60

Delivered at	Erie.	Buffalo.			
	f.o.b.	Afloat.	f.o.b.	ret.	del.
Grate	$5 90	$5 40	$5 90	$6	25
Egg	5 90	5 40	5 90	6	25
Stove	6 35	5 85	6 35	6	70
Nut	6 10	5 60	6 10	6	45

Cost of coal from Erie, Oswego, or Charlotte for Western market, same as if shipped from Buffalo. Terms cash. All payments to be made in New York City funds.

C. M. UNDERHILL, Gen. Salesman, Buffalo, N. Y.

Cincinnati, O. May 16, 1876.

Reported by our Special Correspondents.

The coal market has undergone very little change here for some time, and quotations are about the same, viz.:

Per ton of 2000 lb.	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat.....	7½@8c.	——
Pomeroy coal..... "	5 @6c.	——
Kanawha " ..... "	7 c.	——
Cannel coal, according to quality "	11 @16c.	——

The following are the retail prices delivered

Youghiogheny.....	10c.
Pomeroy	9c.
Cannel	14@22c.
Kanawha Semi-Cannel.....	10c.
Anthracite, per ton.....	10 50@11 00
Coke, at yard.....	7c.
Coke, hard and soft, delivered.....	9@10c.

Indianapolis, Ind. May 16, 1876.

Specially reported by Messrs. COBB & BRANHAM.

We send you the prices for coal and coke, wholesale and retail, in our city. Our coal season is about over, until the 1st September, when we have hopes for a general revival for all kinds of trade—but doubt whether they willbe realized. Collections are very hard to make, and growing worse every day. Our coal and iron interests are suffering from the extreme pressure of the times. There is but little encouragement for manufacturers, and hence coal operators are mining but a small quantity to their facilties.

Wholesale on board cars, and retail delivered to consumers.

Per ton of 2000 lb., bushel of 70 lb.

BITUMINOUS.

White River, per ton....$2 50	Peytona cannel, per ton.	5	75
Brazil Block, " 2 50	Indiana Cannel.....	4	50
Highland, grate, " 2 25	Hocking Valley.....	4	25
Block coal, nut, per car..18 00	Youghiogheny..... ..	4	50
Highland " ...18 00	Blossburg (smithing)...	6	50
Block Slack " ...17 co	Piedmont "	6	50
	Gas coke, per bushel.....		10

ANTHRACITE (Lackawanna and Wilkes-Barre.)

Broken..... ....$8 35	Nut	8	50
Egg..... .. 8 35	Stove.....	8	75

Lehigh Anthracite.

Broken..... 9 75	Nut.....	9	50
Egg..... 9 75	Stove.....	10	00

Retail, per bushel, delivered.

Sand Creek.....15c.	Block Nut, steam.....	8	
White River..... .. 13	" Slack, "	7	
Brazil Block.....14	Peytona Cannel.....	28	
Highland grate. 13	Virginia "	27	
Block Nut, domestic use.12	Youghiogheny	20	
Highland Nut, " " .12	Blossburg.....	26	
" " steam.... 8	Piedmont.....	26	

GAS COKE (measured.)

Crushed.....15c.	Lump.....	12c.	

ANTHRACITE.

Wilkes-Barre and Lackawanna (all sizes).....$9 75 per ton,	
Lehigh, retail .....$11 50 per ton.	

Louisville, Ky. May 16, 1876.

Specially reported by Messrs. BYRNE & SPEED.

Our market is now, as during most of the Winter, very quiet.

Please report our prices as follows:

WHOLESALE.

per bushel		per bushel
Pittsburgh..... 12c.	Pine Hill.....	—
Raymond City..... 9c.	Kentucky.....	8c.

RETAIL.

per bushel		per bushel
Pittsburgh..... 12c.	Peytona Cannel.....20@22c.	
Raymond City..... 11c.	Buckeye " .....20c.	
Pine Hill ... . 13c.	City-made Coke.....10c.	
Kentucky ..... 10c.	Anth., per ton, $10 00 to 10 50	

Screened Pittsburgh per load.....	$3 00
Screened Raymond City.	2 75
Pine Hill (Kentucky).....	2 75
Cannel.....	$5 to 5 50

Milwaukee, Wis. May 17, 1876.

Specially reported by Messrs. R. P. ELMORE & Co.

Retail price per ton of 2000 lb.

Lehigh Lump $10 00	Briar Hill, select.....	$8	00
Lehigh Prepared..... 11 00	Blossburgh	8	00
Lackawanna (all sizes).. 10 00	Cannel	8	00
Pittston 10 00	Pittsburgh	7	00
Scranton..... 10 00	Steam coal...	6	00

San Francisco, Cal.

From the *Commercial Herald*, May 11, 1876.

Imports from Jan. 1st to May 1st :

	tons.		tons.
Anthracite.....	6,724	English.....	8,973
Australian.....	15,719	Vancouver Island....	32,144
Coos Bay.....	14,704	Rocky Mountain.....	98
Cumberland.....	2,044	Seattle	3,078
Mt. Diablo.....	33,832	Bellingham Bay.....	7,600

Low prices continue to rule for all kinds and descriptions. For a large cargo of Lehigh now afloat in this harbor $12 only is offered. Cumberland is also cheaper, by reason of unlocked for opposition from a large iron house. English Steam and Australian cargoes for forward delivery are offering at extremely low prices. Sales of the former for autumn delivery are reported made as low as $7.50@7.75. The Gas Company and steamship lines have contracts for some 50,000 tons English to arrive at very low rates, and this in time will affect the price of Australian cargoes, as well as those of the Pacific coast and other Northern coals. The prospects are flattering for a superabundant supply next Fall and Winter, and at very low prices. Imports for the week embrace the following: 285 tons from Philadelphia per *Martha Davis*; *Theo. Koerner*, 1,600 tons Nanaimo; *Empire*, 500 tons Coos Bay: *Johan Irgens*, 1,100 tons Wellington; 426 tons ditto per *H. W. Almy*; 230 tons Coos Bay per *Parallel*, and 220 tons same per *Alaska*; 1,200 tons Wellington per *Revere*; 1,800 tons Nanaimo per *Winged Hunter*, etc. We continue quotations of Australian $10@10.25 ex ship. Cumberland in casks held at $18@20; bulk, $16@18. Lehigh is plentiful and prices nominal. We quote Bellingham Bay at $8.50; Coos Bay, $10; California Mount Diablo Steam, $6.25@8.25 for fine and coarse respectively; English and Scotch Steam, $9@9.50; Nanaimo, $9.50@10; Seattle, $9.50@10; Anthracite, $12; Lehigh, $12@$14; Wellington, $11@12, latter screened. The *Orpheus* from Nanaimo brings 1,315 tons.

Toledo, Ohio. May 16, 1876.

Specially reported by Messrs. GOSLINE & BARBOUR.

We quote coal as follows:

Per ton of 2000 lb. on cars.

Hocking Valley.....$3 40	Massillon	3	60
Straitsville..... 3 40	Youghiogheny.....	5	00
Shawnee..... ..... 3 40	Blossburg.....	6 50@7	00
" nut..... 2 90	Cumberland.....	6 50@7	co
Briar Hill..... 5 50	Connellsville coke	6	40

ANTHRACITE.

Grate, screened.....$7 20	Stove, screened.....	$7	70
Egg, " 7 20	Chestnut "	7	45
Lehigh Lump..... 9 50			

40 cents to $1 per ton additional for delivery at retail.

Halifax, N. S. May 16, 1876.

Prices per ton of 2240 lb. in gold.

Sydney (old mines).....$4 00	Little Glace Bay.....	3	35
Gowrie..... 2 35	Blockhouse.....	3	35
Victoria..... ..... ——	Albion (at Railroad).....	4	00

Montreal. May 15, 1876.

Specially reported by Messrs. ROBERT C. ADAMS & Co.

With the opening of navigation prices for all descriptions of coal have receded. The depression of trade, the low prices at which American bituminous coals have been sold in Ontario, together with the expectation of large imports of Scotch coal, which vessels are obliged to bring out as ballast for lack of remunerative freights, have all acted to depress rates below those prevailing for some years past. Freights by canal from New York are therefore at the low figure of $1.90, and from the Cape Breton ports and Pictou, N.S, only $1.90 to $2.12½ is paid to sailing vessels and steamers. The Montreal Gas Company has bought 5,000 tons of Caledonia coal, and has also taken a quantity from international mines.

We quote prices :

Wholesale per ton of 2240 lb.

Scotch Steam.....$4 00	Cape Breton Steam.....	$4	00
Pictou " 4 50	Newcastle Smiths.....	5	50

Anthracite at retail, per 2000 lb., delivered.

Egg $6 70	Chestnut.....	6	40
Stove 7 15			

Toronto, Ont. May 16, 1876.

Chestnut..... ....$7 25	
Stove 7 50	
Egg and grate..... ..... 7 25	
Bituminous coal for domestic use..... 6 00	
" " steam..... 3 50@5 50	
Lehigh Lump and broken..... 7 50	
Blossburgh..... 6 50	

Rates of Transportation on Anthracite Coal to Tide Ports.

Lehigh and Wyoming Coals. per ton of 2240 lb	From Penn Haven.	From Mauch Chunk.	From Hazleton**	From Upper Lehigh.	From Ashley and Sugar Notch.
To ‡ Newark, N. J. (117 miles), via Central Railroad of New Jersey...	2 32	2 18	2 74	2 63	2 86
‡ Mauch Chunk, Pa., via Central Railroad of N. J.....	14	..	56	47	70
‡ Philipsburg, N. J., (46 miles).....	87	73	1 21	1 19	1 42
Elizabethp't, (114 m.) Pt. Johns., Hoboken & South Amboy, N. J., shipping and wharfage 35c. add.	1 96	1 82	2 29	2 27	2 50
High Bridge, N. J.....	2 40	1 95	2 80	2 54	2 72
Elizabeth, Cranford, Westfield & Elizabethport, for consumption,	2 32	2 18	2 65	2 65	2 88
Jersey City, N. J., (121 miles) and New York, via L. V. RR.....	2 32	2 18	2 65	2 65	2 88
Andover, via Delaware, Lackawanna and Western RR.....	3 30	3 10	3 70	3 69	3 99
Trenton Somerset Junction and Greensburg, via P. RR. Belvidere Division.....	2 65	2 45	3 05	3 04	3 34
Trenton, (97 m.) for shipment, including shipping and wharfage	2 11	1 95	2 45	2 46	2 76

From *Mauch Chunk* to *New York* (121 miles), (towing limits) and Jersey City† via Lehigh Valley RR..... .. $2 37

From *Mauch Chunk* to *Philadelphia* (93 m.) via L. V. and L. and S. RR. and North Penn. RR 1 75

††From *Phillipsburg, N. J.* to *Hoboken* (84 m.) for shipment via Delaware. Lackawanna and Western RR., Morris and Essex Division 1 08

From *Lackawanna Junction* to **Auburn, N. Y.*, (191 m.) for shipment, via Southern Central R.R. in connection with Pa. and N. Y. R.R..... ..... 2 41

From *Lackawanna Junction* to *Weedsport* (201 m.), for *Rochester and Charlotte*..... ..... 2 47

From *Lackawanna Junction* to *Sterling* for *Oswego, N.Y.*.. 2 50

‖ To this point for all places between Rochester and Buffalo the rate is 2 53

* The rate to this point for Syracuse is..... 2 08

** Rates on line coal from Hazleton are 10c. per ton above these figures.

‡ The cost of unloading is to be added to these rates. No charge less than 40c. per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be $1 15 per ton.

§ Twenty cents per ton less when five cars at a time to one party. Provided that where the reduction makes the rate $1 a ton, or less, the rate will be $1.

† Transportation on Coal destined for re-shipment from this point is 20c. less than above rate.

†† The rate for consumption to this point is $1 80.

The distances in the above table are Computed from *Mauch Chunk*. From *Ashley* to *Mauch Chunk* the distance is 51 miles, and from *upper Lehigh*, 33 miles. From *Hazleton* 24 miles, and from *Penn Haven* 8 miles.

From *Wilkes-Barre* to *Perth Amboy* via the Lehigh Valley Railroad Company, the distance is 101 miles, and from *Mauch Chunk* it amounts to 106 miles.

Freights.

Per ton of 2240 lb.

PORTS.	From Philadelphia.	From Baltimore.	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me	....	....	....	....
Albany	†80	...	...	....
Amesbury, Mass	....	....	....	....
Bangor, Me	....	2 00	....	1 00
Bath, Me	....	1 45	160–65	1 00
Baltimore	....	....	....	....
Boston, Mass	1 25@1 35	1 35@1 45	150–55	1 00
Bridgeport, Ct	*70	1 40	....	60
Bristol, R. I	....	....	....	85
Cambridgeport, Mass.	‡1 30@1 35	....	...	1 00
Derby	....	....	....	....
Dighton	....	....	....	....
East Cambridge	‡1 30@1 35	....	....	‡1 00
Fall River	1 25	1 40	....	85
Hackensack	*70	....	....	....
Hallowell, Me	....	....	....	....
Hartford	*70	....	....	....
Hoboken	†70	1 30	1 25	40
Hudson	....	1 30	1 40	....
Jersey City	70	1 30	1 25	40
Lynn, Mass	....	.. ..	....	†1 00
Middletown	....	....	....	1 00
Mystic	....	....	....	....
Newark	....	1 50	....	....
New Bedford	1 25	1 40	....	85
Newburyport	....	1 60	....	1 10
New Haven	*70	1 40	1 35	60
New London	1 25	1 40	....	40
Newport	1 25	....	....	85
New York	70‡	1 30	1 25	40
Norwalk	70‡	1 40	....	60
Norwich	1 25‡	....	....	80
Pawtucket	1 25‡	....	....	....
Philadelphia	....	....	....	....
Portland	1 25	1 40	....	1 00
Portsmouth, N. H	1 40	1 60	....	1 10
Providence	1 25	1 40	....	80
Poughkeepsie, N. Y	....	....	....	....
Rockport	....	....	....	....
Saco	....	....	....	....
Sag Harbor	....	....	....	1 00
Salem, Mass	1 25@1 35	1 50	....	1 00
Salisbury Pt., Mass	....	....	....	...
Stamford	*70	....	....	60
Stonington	....	....	....	80
Taunton	.. .	...	....	....
Troy	†80	....	....	....
Warren, R. I	....	....	....	85
Wareham	....	....	....	....
Weymouth	....	....	....	....

* And discharging and towing. † And discharging. ‡ And towing. § 3c. per bridge extra.

Freights on Bituminous Coals from the Mines to Tide Water Shipping Ports.

From the Mines to Cumberland and State Line (say an average of 20 miles), the legal charge is 2 cents per ton of 2240 lb. per mile.

From State Line to Amboy (346 miles) $4 per ton of 2000 lb. On coal shipped beyond this point there is a drawback of 75 cents per net ton.

From Cumberland to Baltimore (178 miles) $2.02 per ton of 2240 lb., or $1.80 per net ton (¼ cent per ton per mile for use of hoppers over C. & P. RR.).

From Cumberland to Georgetown (152 miles) by canal, $1.10. Tolls, 46 cents.

From the Mines to Piedmont, 4 cents per ton of 2240 lb. per mile on distances less than 4 miles, and 3 cents per ton per mile on distances over 4 miles, and 2 cents per ton per mile on distances over 10 miles.

From Piedmont to Baltimore (206 miles) $2.34 per ton of 2240 lb., or $2.08 per net ton.

From Osceola to Greenwich, Phila. (say 248 miles) per T. & C. RR., per ton bituminous coal of 2000 lb., less drawback of $1.46 $2.15; rate per gross ton, $2.60.

From Osceola to South Amboy, N.J., (317 miles) per 2000 lb., $4.03, less drawback, $1.03; rate per net ton, $3; add 12 per cent. for gross ton, 36 cents, terminal expenses, shipping, 20 cents; rate per gross ton, $3.56.

Freights on Bituminous Coal and Coke over the Chesapeake and Ohio Railroad.

TO	From New River District, say, at Quinnemont.			
	Bituminous Coal and Coke.			Coal Screenings
	Distances.*	Regular Rate.	Special Rate.	Rate.
	Miles.			
Charleston	75	1 00	70	50
Huntington	127	1 20	80	60
Staunton	158	2 30	2 00	1 50
Charlottesville	197	2 80	2 50	2 00
Gordonsville	218	3 00	2 70	2 40
Hanover Junction	276	3 25	3 10	2 50
Richmond	294	3 25	3 10	2 50
Richmond via Hanover Junction		3 50	3 35	2 75
James River	297	3 25	3 00	2 50

TO	From Kanawha District, say, at Blacksburg				
	Bit. Coal and Coke.		Cannel Coal.		Coal Screenings.
	Regular Rate.	Special Rate.	Regular Rate.	Special Rate.	Rate.
Charleston	80	50	1 20	80	40
Huntington	1 00	60	1 50	1 00	50
Staunton	3 00	2 50	4 02	3 50	2 00
Charlottesville	3 30	2 80	4 25	3 70	2 30
Gordonsville	3 35	2 90	4 40	3 90	2 40
Hanover Junc	3 40	3 10	4 50	4 10	2 50
Richmond	3 40	3 10	4 50	4 10	2 50
Richmond, via Hanover Junc.	3 65	3 35	4 75	4 25	2 75
James River	3 4	3 00	4 50	4 00	2 40

A Terminal charge of ten cents per ton, in addition to rates above, will be collected on all coal and coke at James River. Also, at Huntington, a charge of five cents per ton for transferring by tipple, or ten cents per ton for transfer from car to barge on the river track.

This Tariff supersedes all *Special Rates* on coal and coke to any station, except existing special rates to iron furnaces.

Local Tariff No. 7 will govern rates to all stations, excepting as modified by this special tariff, but the rate to any station, between the stations above designated, shall in no case exceed the rates named herein, to the first point beyond it, of the stations above named.

Special Rates—The rates given above in columns headed "Special Rates," will apply on all shipments of coal or coke mined or made on the line of this road, destined for use in steam or manufacturing purposes; also on all shipments destined for any point off the line of the Chesapeake and Ohio Railroad

Agents, when they cannot be certain that shipments are destined for use in steam or manufacturing purposes, will collect freight at regular rates as above, and overcharges, if any occur, will be promptly refunded through the General Freight Office.

A charge of twenty-five cents per ton, in addition to all rates herein given, will be made for delivery of coal or coke at points *between stations* requiring the use of an engine.

Coal Screenings—By "Coal Screenings" is meant dust, nut and fine coal that will pass through a screen of one and a half inch meshes, and will only be taken at the Company's convenience.

* These distances are computed from Quinnemont (or the New River District) Blacksburg (or the Kanawha District) lies 56 miles west of Quinnemont, which distance will be added to all coal going east of the New River District and deducted from Huntington and Charleston, which lie west of the same.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, May 19, 1876.

American Pig.—We are reported sales aggregating 2,500 tons of the Thomas Iron Co.'s No. 2 foundry iron, at $20, and 300 tons of No. 1 at $22. This company has advanced its prices to $23 for No. 1, and $21 for No. 2. It is nominally out of the market, having sold ahead to a considerable extent. We are also reported a sale of 400 tons of No. 1 foundry by a leading Lehigh company at $22. There has been an attempt to advance prices, but we are unable to notice a stronger feeling in the market as a whole. Buyers, as a rule, are not anticipating their wants, believing that the bottom has not yet been reached. We quote No. 1 foundry at $22@$23; No. 2, $20@$21; and forge at $18@$19.

Scotch Pig.—The market continues to take the importations of this article as they arrive, but holders and importers are not so firm as hitherto. We note sales during the week of 300 tons of Coltness, 200 tons of Glengarnock, and 100 tons of Eglinton, all on terms not made public. We quote Eglinton at $28@$28.50; Coltness, $30@$31; and Glengarnock, $29.50@$30.

MESSRS. JOHN E. SWAN & BROTHERS, LIMITED, of Glasgow, under date of May 5, report 112 furnaces in blast as against 121 a year previous; stock of pig iron in CONNAL & Co's stores, 63,054 tons, as against 30 621 tons corresponding date in 1875; shipments for the week ending April 29, 13,524 tons as against 11,524 for the corresponding week of last year; total decrease in shipments since December 25, as compared with the like period of 1874–5, 35,918 tons; quotations of No. 1 iron:—Gartsherrie, 65/; Coltness, 67/; Summerlee, 63/ 6d.; Langloan, 66/; Glengarnock, 62/6d.; and Eglinton, 57/; freights: to New York 3/6d.; Boston 9/; New Orleans, 5/; Baltimore, 8/; Philadelphia, 10/; and San Francisco, 27/6d.

Rails.—There is but little inquiry, and we learn of no late sales. We quote iron rails at mill at $39@43, and steel at $58@$61 at mills.

Old Rails.—We are reported a sale of 500 tons at a private price, and quote nominally at $22.

Scrap.—We are reported a sale of 300 tons of wrought at $28. The market closes very quiet with quotations at $28@$30.

Boston. May 13, 1876

PIG has had no business worthy of mention during the week, nor any inquiry even for small lots. Holders continue to quote 20@26c. from gray forge to No. 1, in all manner of variations as to brand.

BAR is having a fair trade, and the market holds very steady at $51.50 for guaranteed refined iron. The situation here secures greater strength from week to week, as the Western mills tone up to the prices they charge Western sellers upon orders from the East. Of course everybody understands how it is and why; competition with our local mills and importers compels Western sellers to quote in the East what they would not in the West. But just now, with almost all the dealers wholly out of a number of very desirable sizes, and the local mills and importers unable still to fill orders at the prices, the Western men are squeezing out an advantage, and have stuck uniformly and stiff for 2¼c. since the first of May. The competition just now settles between Cleveland and Pittsburg, but wholly on freights; 25c. is as yet the lowest point reached for a contract of 400 to 500 tons; but the points of delivery here make some difference, hence there is a standing out Common iron still quotes from $40 to $49, and here and there small jags are to be picked up at a trifle less.

OLD IRON is very listless, and the extreme, $1.35 delivered, is realized only in exceptional cases. Our quotations might be understood as dealers' selling rates, deliveries included, which latter cost from 3c. to 5c. per hundred according to the distance to haul and condition of the stock to handle. Shippers who realize $1.20 a $1.25 are undoubtedly securing full values for their lots. A cargo of well-put-up No. 1 would realize $1.28@$1.30, but the seller would be obliged to guarantee the straight selection. Light iron is sought for at full prices. Cast iron is quiet, stove plate closing 5c. among the extreme quoters without increasing business. Machinery is easy, old cullet and rubber dead.—*Commercial Bulletin.*

Baltimore. May 17, 1876.

Specially reported by Messrs. R. C. HOFFMAN & Co.

There has been no change in the iron market since our last report. Sales moderate at quotations.

Baltimore Charcoal	$30@35	Anthracite No. 1	$20@21 co
Virginia Charcoal	28@34	Mottled and White	17@19 co
Anthracite No. 1	23@24	CharcoalC B.Blooms	65@67 50
" No. 2	21@22	Refined Blooms	50@55

Chattanooga, Tenn. May 16, 1876.

Specially reported by J. F. JAMES pig iron broker, etc, 233 Market Street.

Our market has slightly improved since last reported. Some fair sales have been made and a better feeling prevails all round.

The usual four months' time on quotations below is allowed.

Tenn. Ala. and Ga. Charcoal, No. 1 foundry	$21@	22
" " " " No. 2 foundry	20@	21
" " " " gray forge	17@	18
" and Georgia coke, No. 1 foundry	18@	19
" " " " No. 2 foundry	17@	18
" " " " gray forge	15@	16
White and Mottled	14@	—
Tennessee and Georgia cold-blast car wheel	24@	25
Alabama " "	24@	25
Old Rails	cash	22 00
Cast Scrap	"	12
Wrought Scrap	"	16

Chicago. May 16, 1876.

Specially reported by Messrs. ROGERS & Co., dealers in Scotch and American pig iron.

The following are the present quotation for pig metal in our market:

No. 1 Coltness	$38 00@ ....
No. 1 Gartsherrie	38 00@ ....
No. 1 Summerlee	37 00@ ....
No. 1 Glengarnock	36 00@ ....
No. 1 Eglinton	35 00@ ....
Warner's "American Scotch"	30 00@ ....
Massilon No. 1 Foundry	29 00@ ....
No. 1 Grand Tower Mo. ores (Bituminous)	29 00@ ....
No. 2, " " "	28 00@ ....
No. 1 Mill	25 00@ ....
No. 1 Foundry, Ohio	28 00@ ....
No. 2 " "	27 00@ ....
No. 1 Hanging Rock (charcoal)	28 00@ ....
No. 2 " " "	26 00@ ....
Union "A" 1 (Anthracite)	28 00@ ....
Union "B" 1 (Anthracite)	26 00@ ....
No. 1 Lake Superior (charcoal)	28 00@ ....
No. 2 Lake Superior "	26 00@ ....
No. 3 Lake Superior "	26 00@ ....
No. 4 Lake Superior "	28 00@ ....
Bessemer Steel Rails	65 00@ ....
New Iron Rails	45 00@ ...
Old Rails	28 00@ ....

Cincinnati. May 16, 1876.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

Below are the closing quotations of our pig iron market, viz.:

CHARCOAL.

Hanging Rock, No. 1 Foundry	$25 00@	....	—4 mos
" No 2, "	23 00@	....	—4 mos
" Mill	21 00@	22 00	—4 mos
Tennessee, No. 1, Foundry	23 00@	24 00	—4 mos
Tennessee, No. 2, "	22 00@	23 00	—4 mos
" Mill	21 00@	22 00	—4 mos
Missouri, No. 1, Foundry	@	....	—4 mos

STONE COAL.

Ohio, No. 1, Foundry	23 00@	....	—4 mos
" No. 2, "	22 00@	....	—4 mos
Ohio Mill	21 00@	....	—4 mos
Missouri, No. 1 Foundry	27 00@	....	—4 mos
" No. 2, "	26 00@	....	—4 mos
" Mill	24 00@	....	—4 mos

CAR-WHEEL.

Hanging Rock, C. B	40 00@	45 00	—4 mos
Tennessee "	30 00@	32 00	—4 mos
Missouri "	32 00@	35 00	—4 mos
Alabama "	30 00@	32 00	—4 mos

BLOOMS.

Charcoal	60 00@	75 00	—cash

SCRAP IRON.

Cast	50c.@	80	—cash
Wrought	1 00@	1 30	—cash

Cleveland, Ohio. May 16, 1876.

Messrs. C. E. BINGHAM & Co., quote as follows:

Per gross ton, on four months' time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.

No. 1, Lake Superior Charcoal	27 00@	....	
No. 2, " " "	26 00@	....	
No. 1, Anthracite	25 00@	....	
No. 2, "	23 00@	....	

No. 1, Bituminous	25 00@ ...
No. 2, "	23 00@....
American Scotch, No. 1, Cherry Valley	27 00@....
" " B—1, " "	26 00@....
" " No. 2, " "	24 00@....
No. 1, Massillon	27 00@....
B—1, "	25 00@....
No. 2, "	23 00@....

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	26 00@....
No. 4 " " "	27 00@....
Nos. 5 and 6 "	28 00@....

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal	27 00@....

FORGE IRON.

No. 1, Gray	22 00@...
White and Mottled	21 00@...

Louisville. May 16, 1876.

Specially reported by Messrs. GEORGE H. HULL & Co.

Our market is fairly active, without any decided change since last report.

The usual time, four mos., is allowed on the quotations below:

HOT BLAST—CHARCOAL.

No. 1 Foundry, from Hanging Rock Ores	$25 00@26 00
No. 2 " " "	23 00@24 00
No. 1, Mill, from " "	—@—
No. 1, Foundry, from Alabama, Georgia and Tennessee ores	23 00@24 00
No. 2, Foundry, from Ala., Geor's and Tenn. ores	22 00@23 00
No. 1, Mill, from " " " "	21 00@22 00

HOT BLAST—STONE COAL AND COKE.

No. 1, Foundry, from Hanging Rock Ores	23 00@24 00
No. 2, " " " "	22 00@23 00
No. 1, Mill, " " "	21 00@22 00
No. 1, Foundry, from Ala. Ga. and Tenn. Ores.	23 00@24 00
No. 2, " " " "	22 00@23 00
No. 1, Mill, " " " "	21 00@22 00
No. 1 Foundry, from Missouri Ores	24 00@25 00
No. 2 " " " "	24 00@25 00
No. 1 Mill, from Missouri Ores	25 00@26 00

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock Ores	35 00@40 00
" " Tennessee "	28 00@30 00
" " Alabama and Georgia Ores	28 00@38 00
" " Kentucky Ores	28 00@40 00

Milwaukee. May 16, 1876.

Iron remains much the same—sales small.

per ton of 2,240 lb.

Frankfort L. S. Charcoal, No 1	$28 00
" " " No. 2	27 00
" " " No. 3, 4 & 5	25 00
" " " No. 6	25 00
Mil. Anthracite L. S., No. 1	27 00
" " " No. 2	26 00
Wisconsin Iron, No. 1	25 00
Mahoning Valley Bit's No. 1	30 00
" " " No. 2	28 00

Pittsburgh, Pa. May 16, 1876.

Specially reported by A. H. CHILDS, Esq.

Market is quiet and unchanged. While some buyers are ready enough to take up any good lots offered at a concession, they will not purchase in excess of immediate wants, at regular market price.

No 1. foundry	$23 50@25 00—4 mos
" 2, "	22 00@23 00—4 mos
Gray forge	21 00@22 50—4 mos
White and mottled	18 00@20 00—4 mos
Warm blast charcoal	22 00@25 00—4 mos
Cold blast " Western	40 00@45 00—4 mos

Richmond, Va. May 13, 1876.

Reported by ASA SNYDER, Esq.

Virginia Cold Blast Charcoal Pig Iron	$27 to $33
" Warm " " " "	24 to 28
" " " Coke " " 1 X	23 to 24
" " " " " " 2 X	21 to 22
" " " " " " 3	20 to 21
" Anthracite 1 X	24 to 23
" " 2 X	22 to 22
" " 3	21 to 25

St. Louis. May 16, 1876.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

Our market is still dull and demand light, with nothing bright or encouraging in the near future.

We quote on four months' time:

Mo. Stone Coal No. 1 Fy.	$25@26	Massillon Iron, A No 1	29@30
" " " 2 "	23@24	" " B " 1	34@—
" " Gray Mill,	22½@23	" " " 2	28@—
" Charcoal No. 1, Fy.	23@24	Cold Bl. Car Wheel, Mo.	30@33
" " " 2, "	22@23	" " " Tenn.	30@33
" " Gray Mill,	22@23	" " " Ala.	30@33
Tenn. " No. 1, Fdy	23@24	" " " H. R.	33@35
" " " 2, "	22@23	Mo. Charcoal Blooms	50@65
" " Gray Mill	22@23	" Scrap "	45@55
Va. Coke, No. 1, Fdy.	24@25	" " hammered	
" " " 2, "	23@24	Billets	75@80
" "Gray Mill,	21@23	Assorted Bar Iron 2 50, 60days	
H. R. Char. No. 1, Fdy.	25@26	No. 1 Wrought Scrap 90c. cwt.	
" " " 2, "	24@25	Heavy cast " 70 "	
" " Gray Mill,	24@25	Light " " 50 "	

San Francisco, Cal.

From the *Commercial Herald*, May 11, 1876.

The market for pig iron exhibits no improvement whatever. The Dawn from Oregon brought 30 tons; price $32.50. The *Zealandia* from Sydney brought 800 blocks pig tin. The steamship *City of Sydney* for Panama carried en route to New York 232,000 lb. pig lead. There is now a large stock of Scotch pig iron in market, but leading holders are not offering at current rates. There is rather more tone to the market for bar and other manufactured iron, but without notable change in values. The general jobbing trade in this department of goods is fair for the season, though not up to the full average of the past. Tin plate is very plentiful, and selling at low prices. We quote Sydney block tin at 21c. The ship *Victoria* from Liverpool brings 9,000 bxs tin plate and a larger quantity of wrought and other iron.

Montreal. May 9, 1876.

With the opening of navigation trade has improved, and a good business has been done since last report. Prices continue unchanged. Imports for the first quarter of 1876 when compared with imports for the same period of 1875 show a considerable falling off both in Iron and Hardware.

Imports.	1875.	1876.
Iron	$335,469	287,461
Hardware	717,803	486,902
	$1,053,272	$774,363

We continue to quote: Pig iron Eglinton and Clyde $21@21.50; Carnbroe $21.50@22; American $22@24; Summerlie and Calder $22@23; Langloan and Gartsherrie $22@23; Coltness $22.50@23.50; Hematite $30@31. Bar, per 100 lb., Scotch and Staffordshire, $2.20@2.25; best do., $2.50@2.60. Swedes and Norway $5@5.50; Low Moor and Bowling, $6.50@7—*Monetary Times.*

METALS.

NEW YORK, FRIDAY EVENING, May 19, 1876.

The whole market is very quiet, sharing in the depression which marks all classes of trade. The only article that attracts any attention at all is pig tin.

ERNEST W. S. MURRANT, Esq., of London, under date of May 5, says: "Trade in metals, as with the majority of other articles of foreign produce, continues to drag on in a slow, weary, and unpleasant manner; with now and then a flickering attempt at recovery, which only serves to render the general dullness more apparent."

Gold Coin.—During the week under review, gold coin has ranged from 112¼ to 112⅞ and closed at 112⅝.

Bullion.—The downward tendency to the price of silver, noticed in our last, has continued during the week, until to-day the price in London is 52¼d. per oz. with the market weak, while here it is $1.14⅛ and in San Francisco 12 per cent. discount. Fine gold bars are unchanged in price, and quoted as follows: New York, par ($20.67, gold, per oz.,) to ¼ per cent. premium; San Francisco, par; and in London, 84/ 7½d.

Copper.—There is but very little business doing in this article and prices are much weaker; ranging from 21⅛c.@21¼c. The first copper from Lake Superior, will probably arrive during the latter part of next week, and with no prospects of an increased home demand it is very probable that we will be able to note some further sales on foreign account; Our exports this year have already amounted to more than 5,000,000 lb. with much more sold but not yet shipped. Chili bars are quoted in London, by cable, to-day, at £78.

The total stocks of copper in England, France, and Chili, chartered and afloat, as per mail advices, was as follows: Jan. 1, 1876, 28,342 tons; April 1, 1876, 31,351 tons; May 1, 1876, 32,154; May 1, 1875, 30,163, tons; and May 1, 1874, 36,997 tons. The deliveries from stocks from Jan. 1, to April 30, were as follows for the several years: 1876, 18,779 tons; 1875, 21,329 tons; 1874, 200,57 tons. The deliveries during the month of April in the several years was as follows: 1876, 5,667 tons; 1875, 6,656 tons; 1874, 5,321 tons.

Mr. MURRANT says of copper: "Foreign descriptions are somewhat firm, the action of smelters and others, who have appeared as rather eager buyers of furnace stuff and bars during the month, having been to considerably harden prices. The statistics of this metal are decidedly favorable, and in better times would no doubt attract the attention and cash of speculators, and very possibly absorb the latter—in such periods of commercial depression and semi-panic as the present, however, such an occurence is not likely to take place, and therefore no considerable recovery can be expected just now."

Tin—There has been a very fair business in pig tin among the dealers, although the consumptive demand is very light. Stocks are well held, with no tin to arrive, and prices have still an upward tendency. The position of this article is much better than it has been for a long time. By cable to-day Straits is quoted in London at £76 10/@£77, and L. & F. £80, while Singapore quotes at $21¼@$21½. The London quotations for Straits show an advance of £2@£2 10/ over those of a week ago. This market in sympathy with London, and in accordance with our own statistical position, has advanced to the following figures: Straits, 18¼c.@18½c.; L. & F., 17¾c.@18c.; Refined, 18c.; and Banca, 21¼c.@21½c.—prices all gold.

The stock of foreign tin in London and Holland, and tin afloat for Europe was as follows; Jan. 1, 1876, 11,600 tons; April 1, 1876, 12,207 tons; May 1, 1876, 12,418 tons; May 1, 1875, 10,417 tons; and May 1, 1874, 5,905 tons. The deliveries from January 1, to April 30, were as follows: 1876, 6,713 tons; 1875, 6,382 tons; and 1874, 5,397 tons. The deliveries for April were as follows: 1876, 1,547 tons; 1875, 2,043 tons; and 1874, 1,437 tons.

Mr. MURRANT says of tin: "The present price of foreign is almost identical with that of a month ago, the fluctuations of the month having been immaterial. The tinplate makers' resolution to work only during a portion of each month would appear to be producing the natural effect of a lighter delivery out of stock here, as the coupled London and Holland deliveries for the past month fall about 500 tons short of those for the same period last year. This is not encouraging, but yesterday some good business transpired, to the extent of over 100 tons of Australian at 72s. cash, and a considerable quantity of Straits at 72s. and 72s. 6d. spot, closing sellers at the latter price, with buyers about 10s. per ton below."

Tin Plates.—These are exceedingly dull, and show no change in prices. We quote, in gold, per box, as follows: Charcoal tins, $7@$7.25, and ternes, $6.50@$7; Coke tins, $6@6.25, and ternes, $5.62½@$6.

Lead.—The Government sold, yesterday, 200 tons of its lead at 6¼c. gold. The sales of ordinary domestic during the week have aggregated about 100 tons at 6¼c.@6¼c. gold. Foreign is nominal at 6¾c. gold, with nothing doing in it. In St. Louis, soft is quoted at 7c. currency, and ordinary at 6½c.@6¾c. currency, freights here 45c. per ton.

Spelter and Zinc.—The market for domestic spelter is very much demoralized, outside lots having sold during the week at 7½c. currency, while the Combination nominally holds at 8c. currency, less one per cent. for cash. Sheet zinc is very dull at 8½c.@8¾c. gold.

Antimony.—This article is very quiet at 15½c.@16c. gold.

Quicksilver.—This article shows a further decline, and is quoted at 55c. per lb. in San Francisco, 60s. here, and £10 per flask in London.

The San Francisco *Commercial Herald* of May 11, says: "Our market continues rather sluggish, causing prices to rule in buyers' favor, yet now quotable at 55@57c. Exports for the week; To Mexican ports per *Newbern*, 180 flasks; to New York via. Panama steamer, 50 flasks. At the close some holders are offering to sell at 55c prompt cash, gold, with sales of 500 flasks at this."

FINANCIAL.

New York Stocks.

FRIDAY EVENING, May 19, 1876.

Dullness and depression still continue the prevailing elements in the market for coal stocks. Our record of transactions in these compared with the general business of the Board shows unusually large sales aggregating nearly 40,000 shares. The reason for this, however, will probably be found more in the speculative disposition of operators than in the desire to purchase for permanent investment. We cannot as yet see any foundation on which to build the hope that the bottom has been reached in the market value of many of these stocks. The condition of the coal trade is so unsatisfactory and prospects for future dividends so uncertain that investment shares are gradually finding their way to market.

Delaware, Lackawanna and Western RR.—This stock has sold during the week to the extent of over 24,000 shares, between 100 and 104½ seller 60 days, finally closing firm at 105⅜, which is ⅞ below the closing price in our last.

This company is now making a survey for a short line to connect the Utica Division at or near Earlville, N. Y., with the Utica, Clinton & Binghampton road at or near Smith's Valley. The latter road is now also worked by this company, and, with the proposed connection, will make a line from Earlville to Utica some five miles shorter than that of the Utica Division.

The condition of the Utica, Clinton & Binghamton road has been very much improved since it was given up by the Midland. A large number of new ties and rails have been laid, and the road otherwise put in better order.

On the Utica Division the standard gauge rails have been laid for 16 miles, being put down inside the present six-feet gauge rails. Other preparations for the change of the gauge are being hurried forward. It is said that the change will probably be made by May 27.

A change of the gauge between Scranton and Washington, a distance of eventy-eight miles, was made on the 15th inst. in seven hours and a half. At six o'clock in the morning a large force of men commenced at either end of the road, and at 1:30 the work was completed, and narrow gauge cars sent over the route.

New Jersey Central RR.—This stock is weak, and has fluctuated between 83 and 95⅛, as the extreme quotations of the week, closing at 83¾, a decline of ten points from the price recorded in our issue of the 13th inst.

Consolidation Coal Co.—This stock is $1.50 per share lower, with transactions aggregating 1,300 shares at from 40 to 41½ per share. Reference is made to this company's prospects in our Coal Trade Review.

Union Mining Company of Tennessee.—Nearly 12,000 shares of this stock has changed hands at from 1¼ to 1½ per share. The dealings in the other stocks of our list do not call for special comment.

Bonds have sold to the extent of $75,000, and are generally unchanged.

Ohio and Kentucky.—The foreclosure sale of the property of the Ohio and Kentucky Coal, Iron and Railroad Company, which was to take place April 20, has been adjourned to May 20. The property is situated in Lewis, Carter and Greenup counties, in Kentucky, and includes some tracts of coal and iron lands, with about 30 miles of railroad built to serve the mining properties, and extending from Sandburg, Ky., to Boons Furnace.

Virginia and Truckee.—This road is now running no

less than 50 daily trains. About 15,000 cords of wood per month are carried to Virginia and Gold Hill, and the ore traffic between Virginia and the mills along the Carson River is very large. There are 22 engines now in use and two more have been ordered from the Baldwin Locomotive Works.

Utah Northern.—A force of 50 men is at work on the tunnel 15 miles north of Franklin, Idaho, and the contractor promises to have it done by July 1. The superstructure of the Bear River bridge is finished and has been shipped from Chicago.

Straitsville Coal and Iron Co.—This company will hold its annual meeting on the 20th inst.

Quotations and Sales of Stocks and Bonds,

For the week ending May 19, 1876.

STOCKS.

	Highest	Lowest	Closing	Shares sold.
Pennsylvania Coal Co	—	—	*270	—
Consolidation Coal Co	41¼	40	40	1300
Spring Mt. Coal Co	—	—	*50	—
American Coal Co	—	—	*46	—
Maryland Coal Co	—	—	12¼	150
Del., Lack., and West. RR. Co	109	105½	105¾	24178
New Jersey Central RR. Co.	95¾	83	83¼	12128
Delaware and Hudson Canal Co.	111	110	110	763
Quicksilver Mining Co. pref'd	—	—	21	200
" " " Common	—	—	15½	100
Mariposa Land & Min. Co. pref'd	7½	7	7⅜	300
St. Louis & Iron Mountain RR.	—	—	17⅛	5
Lehigh & Wilkes-Barre Coal Co.	—	—	*40	—
Total Shares sold				39124
Sales for the week previous				19053
Increase				20071

* Nominal.

BONDS.

	Sales.		Price
Ches. & O. R. R. 6s, 1st. cou. on	2,000	.....	29⅜@ 30¾
" " " ex coupon	—	.....	— @ 26
Central RR. of N. J. 1st Mtg. N.	6,000	.....	112⅝@113
" " " 1st Cons.	2,000	.....	— @102½
" " " Convt.	28,000	.....	102⅛@104
Del. and H. Canal, 1st Mtg. 91'	3,000	.....	110 @111
" " 7s, '84	—	.....	— @110
" " Reg. '94	21,000	.....	— @108
Del., Lack. & W. R. R., 7s, conv.	—	.....	— @ —
" " " 2d Mtg.	—	.....	— @108
St. Louis & Iron Mount'n 1st Mtg	13,000	.....	100¼@101¾
St. Louis & Iron M'tn. 2d Mtg.	—	.....	— @ 75½
Lehigh & Wilkes-Barre Cons.	—	.....	— @ —
Total Sales	$75,000		

Closing quotations, in the absence of sales, represent the latest prices bid.

Philadelphia Stocks.

PHILADELPHIA, May 19, 1876.

Stocks in this market are lower, probably in sympathy with those dealt in at the New York Board. The total week's transactions aggregate 71.876 shares; the market at the close was unsettled.

Philadelphia RR.—This stock has sold to the amount of 54,650 between 53¼ and 51¾. Seller, 60 as the range, closing at 53¾, a decline of 1¼ from our last.

Reading RR.—Stock has sold to the amount of over 11,000, between 44¼ 43¾. Seller, 60 as the extreme limits, closing at 44¼. This stock appears steady at this price, ⅛ per cent. representing the extreme "regular" fluctuation during the week's business.

Lehigh Coal and Navigation Co.—Nearly 5000 shares of this stock changed hands at from 46⅛ to 44¾, closing at the latter figure, which is nearly $2 per share lower than in our last.

Lehigh Valley RR.—657 shares sold during the week at 58 to 57⅛, closing at the lower price, a fractional decline from our last.

The City Council of Newark, N. J., has granted permission to this company to establish a large coal depot in that city, and work upon the necessary sidings, trestles, etc., will be begun at once.

Bonds—The transactions aggregate $64,800, without any material alteration in prices.

Cambria Iron Co. will call a special meeting on the 23d inst.

The Chesapeke and Delaware Canal Co. will hold its annual meeting on June 5th.

United N. J. RR. and Canal Co.—The annual meeting of this company will be held in Trenton, N. J., on the 30th inst.

Crescent Silver Mining Co. of Colorado.—300 shares of this stock sold at auction during the week at 10c. per share.

Potomac Coal Co.—We note an auction sale of 110 shares of this stock at $1⅛ per share.

Quotations and Sales of Stocks and Bonds.

For the week ending May 18, 1876.

STOCKS.

	Highest	Lowest	Closing	Shr's
Lehigh Valley RR. Co	58	57⅛	57¾	657
Pennsylvania RR.	53¼	51⅞	52⅝	54650
Reading RR.	44⅛	44⅛	44⅛	11216
Lehigh Coal and Nav. Co	46⅛	44¾	44¾	4878
Penn. Canal	—	—	*9	—
Buck Mountain Coal Co.	—	—	25	—
Fulton Coal Co.	—	—	*3¾	—
Locust Mountain Coal Co	—	—	—	—
Westmoreland Coal Co.	—	—	79⅛	—
St. Nicholas Coal Co.	—	—	*1	—
Cambria Iron Co.	—	—	15⅛	441
Crane Iron Co.	—	—	25	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co.	—	—	68¼	34
Total shares sold				71,876
Sales for the week previous				90,248
Decrease				18,372

* These quotations are nominal.

BONDS.

	Sales.	Price
H. and B. T. RR. 1st mortgage, 7s	—	— @107
" " " 2d " "	—	— @104
" " " 3d " cons	—	— @ 50
Lehigh Valley RR. Con. mtg. 6s, Reg.	7,000	101¼@101½
" " " 7s, 1910	3,000	— @109¾
" " " 6s Reg.	2,000	— @108
Pennsylvania RR., 1st mtge. 6s	4,000	— @106⅞
" " gen. " cou. 1910	—	— @105
" " gen. " 6s, reg.	—	— @106
" " Cons. M. 6s reg.	—	— @100
Phil. & Reading RR. 7s '93	1,000	— @107
" " G. M. 7s, cou.	11,000	— @105½
" " " " Deb. 7s	—	— @ 82†
" " new convertible 7s	16,600	— @100
" " mtg. 6s '44-'80	5,000	— @104
Phil. & Reading C. & I. Co. Deb. 7s	—	— @ 80†
" " Swatara tract	—	— @ —
Lehigh Coal & Nav. Co., 6s '84	100	— @102¾
" " " RR. 6s, '97	600	— @103
" " " gen. m. 7s Reg.	1,000	— @105
" " " Convt. gold, '97	6,500	103⅛@104
Penn. Canal, 6s	—	— @ 75½
Penn. and N. Y. Canal, 7s	2,000	— @109⅛
Ches. and Del. Canal, 6s	—	— @ 86½
Susquehanna Canal, 6s	2,000	— @ 73¼
Delaware Division Canal, 6s	—	— @ 99¾
Susquehanna Coal Co. 6s	—	— @ 80
Buck. Mount Coal Co. 6s	—	— @ 97¾
Penn. Gas Coal Co. 6s	—	— @100¾
Honeybrook Coal Co. 7s	3,000	— @ 90
Total amount of sales	$64,800	

Closing quotations, in the absence of sales, represent the latest prices bid.

† Asked.

Gold and Silver Stocks.

NEW YORK, FRIDAY EVENING, May 19, 1876.

The mining share market is irregular, with the exception of a decline of $1 per share in each of the Bonanza stocks, the principle quotations have materially advanced.

Consolidated Virginia.—The bullion shipments of this mine for the month of April amounted to $2,237,000, between 2,300 and 2,400 tons of ore now being extracted from this mine per week. The C. and C. shaft is 1,251 feet in depth.

California.—This company has declared its first dividend of $2 per share payable on the 15th inst This aggregates a disbursement of $1,080,000, the same as that of the Consolidated Virginia Company, and with that of the Consolidated Virginia Company amounts to $2,160,000, which these two companies, occupying but 1,310 feet of vein, will probably pay each month to their stockholders, or nearly $26,000,000 per year. It is quite possible, however, that these dividends will be increased when hoisting from the joint shaft begins, should the the Bonanza hold out so long. The total bullion returns of the California Company for the month of April, amounted to $1,450,000, and the present weekly ore product averages about 1,800 tons.

Belcher.—This stock has advanced $3 per share. Daily yield of ore 400 tons.

Alpha Consolidated has made a notable advance of $21 per share.

Imperial.—The ore body in the Imperial continues to extend to the northward, and the prospects are that the Alpha drift on the 2,000 foot level will soon cut the same ore vein.

The Northern Belle shows a bullion product of $122,000 for the month of April.

Chollar-Potosi extracted $23,200 in April.

The Eureka Gold Mine, Grass Valley, yielded 460 ounces gold amalgam from the last weekly clean-up.

Eureka Consolidated.—It is reported that Eureka Consolidated and the K. K. Consolidated silver mines, of Nevada, are to be combined in a single company.

The Julia has just opened a station at the 1,800-foot level.

In the Silver Hill Mine the east and west crossent from the wings are each advanced 2 to 2½ feet per day, without apparent change to 4th inst. The rock is hard blasting and flow of water strong. This stock is firm at a slight advance.

In the Yellow Jacket preparations are being made to ascertain the value of the mine below the 1,940-foot level. This stock has advanced $9 per share within the week.

The Empire Mining Company.—The Albatross, Persian, Warrior, Black Diamond and Baltimore gold mines and the Wilcox Tunnel at Spanish Bar, Colorado, have been consolidated and transferred to the Empire Mining Company.

The Jefferson Mining Company have levied an assessment of 75c. per share, amounting to $37,500, delinquent June 9th. The mine is in Nye County, Nevada, and two dividends have been paid out of it, aggregating $50,000, the last one being paid a year ago. The present is the first assessment.

The Great Western Quicksilver Mining Company has delared a dividend of 50c. per share. This will aggregate $112,500 in dividends paid by this company since 1873.

New Mining Companies in Nevada, California, etc.—We note the recent incorporation of the following mining companies:

Name.	Location of Mines.	Capital Stock.
English G & S. Mining Co.	Storey Co., Nev.	$10,000,000
Trenton Mining Company.	Lyon Co., "	10,000,000
Howe Silver Mining Co.	Elko Co., "	10,000,000
Mollie Stark Silver Mining Co.	Nevada	10,000,000
Alameda G. & S. Mining Co.	Elks Co., "	5,000,000
Tigress Silver Mining Co.	Storey Co., "	5,000,000
Concordia G. & S. Mining Co.	" " "	15,000,000
Beethoven G. & S. Mining Co.	" " "	15,000,000
East Overman Silver Mg. Co.	Nevada	10,000,000
Roscoe Prospecting Co	Nevada	10,000,000
Washington Mining Co.	Cal., Nev. & Ariz.	10,000,000
Gopher Hill Gravel Mining Co.	Plumas Co., Cal.	2,000,000
St. Lawrence Gold Mill & Mg. Co.	El Dorado Co., Cal.	1,500,000
South Modoc Mining Co.	"Various"	10,000,000
Con. Golden Star G. & S. Mg. Co.	Grass Val. Dis., Cal.	150,000
Minniatta Bell S. M. Co.	Inyo Co., Cal.	10,000,000
Crœsus Gold Mining Co.	Amador Co., Cal.	5,000,000
Keystone Silver Mining Co.	Iyor Co., Cal.	10,000,000
Mountain Vein S. Mining Co	" " "	10,000,000
South Almaden Mining Co.	Santa Clara Co., Cal	10,000,000
Pope Valley Quicksilver Mg. Co.	Napa, Cal.	10,000,000
New Eva Gt. S. Mining Co.	Alpine Co., Cal	1,000,000
Laederichburg Gold Mining Co.	El Dorado Co., Cal.	5,000,000
Ne Plus Ultra Copper Mg. Co.	Fresno Co., Cal.	270,000
Catapileo Gold Mining Co.	Ligna, Chili	1,000,000
Blind Spring Mill & Mg. Co.	San Francisco	5,000,000

QUOTATIONS:

	No. of feet on Vein.	No. of shares.	May 11.	May 18.
Sierra Nevada	3,300	100,000	$16	$16
Union Consol'd	600	100,000	13	12
Mexican	600	108,000	33	32
Ophir	675	108,000	54	55
California	600	540,000	80	79
Consol'd. Virginia	710	540,000	74	73
Best & Belcher	540	100,800	55	58
Gould & Curry	612	100,800	17	18
Savage	771	112,000	17	20
Hale & Norcross	400	16,000	56	64
Chollar Potosi	1,400	28,000	82	90
Alpha Consol'd	306	30,000	47	68
Imperial Con.	468	500,000	5	5
Yellow Jacket	957	120,000	28	27
Kentuck	95	30,000	12	14
Crown Point	541	100,000	16	17
Belcher	1,040	104,000	19	22
Overman	1,200	38,400	64	68
Caledonia	2,188	100,000	8	9
Justice	2,100	105,000	26	27
Raymond & Ely	5,000	30,000	14	13
Meadow Valley	4,400	60,000	1	1
Eureka Consolid.	....	50,000	11	12
Eureka G. V.	1,680	20,000	3	3
Silver Hill	5,400	54,000	8	9
Julia	3,000	110,000	11	12

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & CO., Bankers and Brokers, Room 7 Traveller Building, 31 State Street, Boston.

BOSTON, THURSDAY EVENING, May 18, 1876.

There is absolutely nothing doing in the copper market. Allouez is a trifle firmer, but no sales. Calumet and Hecla steady, at 166¼@167, with occasional sales of small lots at 167. Duncan quiet at $1.50 asked. Franklin steady, at 11¼ bid. Quincy is strong, at 45¼ bid; sale of 10 shares this noon, at 45½. Small coppers nothing doing.

DESCRIPTION.	Par Value.	No. of Shares.	CLOSING. Bid.	Asked.
Allouez	$50	20,000	$15 00	$20 00
Calumet and Hecla	25	80,000	166 50	167 00
Central	25	20,000	30 50	31 00
Copper Falls	50	20,000	3 00	3 50
Dana	25	20,000	8	12½
Franklin	25	20,000	11 25	11 50
Humboldt	25	20,000	9	11
Madisca	25	20,000	27	30
Mesnard	25	20,000	50	60
Minnesota	25	20,000	1 50	2 00
National	25	20,000	1 50	2 00
Osceola	25	40,000	21 00	22 00
Petherick	25	20,000	50	60
Pewabic	25	20,000	3 00	3 50
Phenix	25	20,000	12 00	13 00
Quincy	25	20,000	45 25	45 75
Ridge	25	20,000	4 75	5 00
Rockland	25	20,000	24	27
International Silver	20	60,000	9	12½
Star	25	20,000	50	52
Superior	25	20,000	10	15
Duncan Silver	20	60,000	1 25	1 50

Gas Stocks.

NEW YORK, Friday Evening, May 19, 1876.

Gas stocks continue quiet and moderately firm. We change the majority of the quotations of New York stocks to slightly advanced figures, the only exception being the Manhattan Company, which has declined $5 per share. The stock of the Williamsburgh Company has advanced $2 per share, this being the only exception to a decline of the Brooklyn list.

Tarrytown, N. Y., Gas Company.—The streets of Tarrytown will shortly be lighted with gas.

Cambridge, Mass., Gas Company.—We note small transactions in this stock, at a recent auction sale in Boston, at $135 per share.

Malden and Melrose, Mass., Gas Company.—Private transactions in this stock is reported to us $95 per share.

Chelsea, Mass., Gas Company.—35 shares of this stock sold through private hands at 113½ per share.

Montreal Gas Company.—We note sales of this stock amounting to 50 shares at from $1.67 to $1.67 per share.

Maryland Gas Light Companies. From the annual report of the Comptroller of the State of Maryland for the year ending September 30th, 1875, we take the following, showing the amounts of taxes paid into the Treasury by the various Gas Companies throughout the State.

Annapolis Gas Light Company					$81,90
Cumberland	"	"	"		192,96
Easton	"	"	"		15,94
Elkton	"	"	"		25,08
Frostburg	"	"	"		32,50
Baltimore	"	"	"		7,432,48
Hagertown	"	"	"		54.27
Peoples	"	"	"	Baltimore	3,819,84
Total					$11,654,97

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H. PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad st., N. Y.

Quotations "bid" and "asked" of New York City and Vicinity Gas Companies are on the $100 of stock and not on one share.

Companies in New York and Vicinity.	Cap. Stk.	Par.	last Div.	When Paid.	Bid.	Askd.
			pr.c			
Mutual, N. Y.....	$5,000,000	$ 100	2½	Jan. '76	109½	110½
" " Bonds	900,00	1,000	†3½	Feb. '76	105	
NewYork, "	4,000,000		5	Jan. '76	135	140
Metropol. "	2,500,000	100	5	Mar. '76		150
" " Certf.	1,000,000	...	3½	" "	103½	
" " Bonds	500,000	1,000	3½	Jan. "	105	
Harlem "	1.850,000	50	4	Feb. '76	118	122
Manhattan" .	4,000,000	50	10	Jan. "	250	255
Brooklyn, B'klyn..	2,000,000	25	5	Nov. '75	190	200
Nassau " ..	1,000,000	20	4	Jan. '76	80	87½
" "Certf.	700,000	1,000	3½	Nov. '76	94	95
People's "	1,000,000	10	3½	Jan. '76	60	70
" "Certf.	300,000	1,000	3½	Jan. '76	82½	86
" " Bds	325,000	....	3½	Feb. "		95
Metropol. "	1,000,000	10	3½	Nov. '75	68	72
Wmsburgh " ...	1,000,000	50	5	Jan. '76	122	130
" "Certf.	1,000,000	....	3½	Jan. "	100	102
Citizen's "	1,200,000	20	2½	Jan. '76	92	95
" "Certf.	320,000	1,000	3½	April "	99	101
J. C. N.J.....	386,000	20	5	July,'75	160	170
Centl.Westch. N.Y.	466,000	50	4	July. "	95	100
Subur'n " "	390,000	50				100

† Gold.

Companies out of Town.*	Cap. Stk.	Par	Bid	Askd
People's " " of J. C.....			120	133
¶Citizen's G. L. Co., New'k. N.J.	1,095,000	50	85	90
Hempstead" " L. I., N.Y.	40,000	100		100
Jamaica, " " "	25,000	100		100
Richmond Co., S. I. "	300,000		100	105
Citizens', Rochester, "		100	60	68
Rochester Gas Co., "		100	50	
‖People's G. L. Co. Albany,"	1,000,000	100		35
§Mutual " Buffalo "	750,000	100	48	55
Mutual " Detroit. Mich.		50	18	
TroyG. L. Co., Troy, N. Y.....			108	
Citizens " " "	600,000	100		100
Brockport. N. Y., G. L. Co.	25,000	100	60	80
†Baltimore G. L. Co., Balt., Md	2,000,000	100	185	
St. Louis G. L. Co., St.Louis, Mo	600,000		110	130
People's G. L. Co., Balt., Md	2,000,000	25	25	25½
Hannibal G. L. Co., Hanni., Mo.	100,000	100	95	100
La Clede, St. Louis, Mo	1,200,000	100	110	115
Lewiston G. L. Co., Lewis., Me	400,000	100	50	85
Chicago G. L. Co., Chicago, Ill.	2,000,000	100	125½	
Jacksonville, Ill.....	120,000	100	82	
‡Lima, Ohio.....	60,000	100	10	
Derby G. L. Co., Derby, Conn..	160,000	100	60	80
Woonskt G. L. Co.Woonskt,R.I.	150,000	100	100	
Fort Wayne G. L. Co. F. W.,Ind		100	90	100
North. LibertiesG. L. Co. Phila.		25	29	
Wilkes-Barre G. L. Co W. B. Pa.		50	70	
Washington G. L. Co., Phila....			42	43
Pottsville, Pa.. Gas Co....		50	40½	
Portland G. L. Co. Portland, Me	350,000	50	72	75
Hartford G. L. Co., Hartford,Ct	700,000	25	41	
Boston G. L. Co., Boston, Mass.	2,500,000	500	785	790
East Boston, Mass		25	132	
Chelsea G. L. Co. Chelsea, "	300,000		139	
Cambridge G. L. Co., Cam., "	700,000		132¾	
Louisville G. L. Co., Louis., Ky.			127	
Cincinnati G. L Co , Cincin, O..				200
Carondelet G. L. Co., Mo ..		50		6¼
S. F. G.L. Co. San Francisco,Cal	10,000,000	100	99	100
Stillwater G. L. Co., Minn... .	50,000	50		26
City G. L. Co. Montreal, Can....	1,440,000	40	165	167
Consumers G. L (old.) Tor.,Ont	600,000	50	133	
Hamilton G. L. Co., Ont.....	150,000	40	112½	
Halifax G. L. Co., Halifax, N.S..	400,000	40	143	148

* These quotations represent the latest obtainable prices at which sales were made.

† This Company has issued $1,000,000 in certificates in addition to their stock indebtedness, on which they pay interest at the rate of 6 per cent. gold.

‡ This Company has $30.000 in bonds outstanding.

§ $200,000 represents the bonded indebtedness of this Company.

‖ $350,000 of the indebtedness of this company is represented by bonds.

¶ $124,000 of the indebtedness of this company is represented by bonds ; also $53,000 in certificates, which is included in the aggregate stock debt quoted.

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The Rates of Freight charged.
The Distances from the Coal Fields to the principal Markets.
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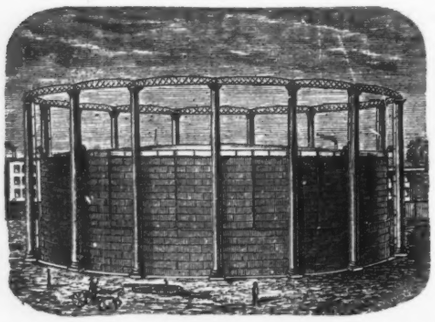

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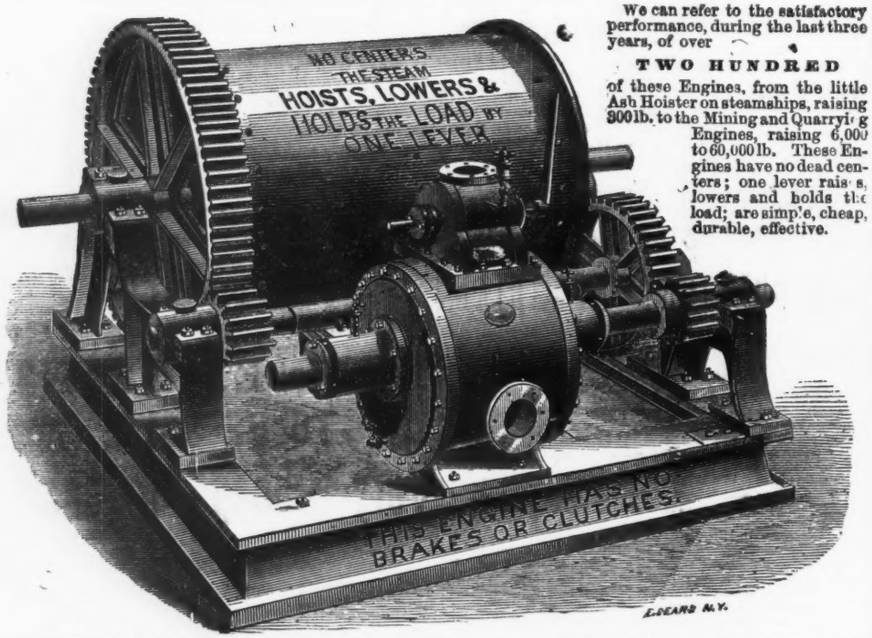

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